Catalina Island Restoration Project
10-Year Workplan (2026-2036)

Prepared by the Catalina Island Conservancy Conservation Department

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Contents

1. Introduction

The Catalina Island Restoration Project (Project) aims to restore ecological integrity on Santa Catalina Island, 88 percent (42,135 acres) of which is owned and managed by the Catalina Island Conservancy (Conservancy) in Los Angeles County, California. The Project focuses on mitigating threats posed by invasive plant species, human-caused fire ignition, nonnative ungulates, and a changing climate, which have collectively led to biodiversity loss, erosion, decreased water capture, and reduced habitat quality. The Conservancy plans to begin the Project in 2026 and are committed to continuing it through 2056. This document covers the first ten years of the Project and a new workplan will be provided to Region 5 in 2036. A report on the Project will be provided to Region 5 in 2031.

The first ten years of the Project aim to refine broad invasive plant treatments followed by seeding native species within an enclosed 10-acre site. That site will be broadened to 105 acres before starting a second major restoration location. Critically, to reduce detrimental impacts from the high rate of dispersal of invasive species, active restoration will be paired with extensive biosecurity measures, such as invasive plant treatments and mortality tracking and a vaccination program for the Catalina Island fox. The Project is built on a foundation of adaptive management with two scales of monitoring occurring: 1) Island-wide and 2) active restoration focused. Finally, invasive Mule deer will be removed from the landscape to allow for Island-wide passive restoration and active habitat restoration to occur. Together all aspects of the Project will ensure a safer and more biodiverse Catalina Island for all – ultimately removing cages and fencing from the landscape and expanding historic California to all of the Island. This Project is one of the greatest gifts the Conservancy can bestow to future generations.

2. Landscape-Level Active Restoration

2.1. Introduction

Starting in 2026, the Conservancy plans to prepare for landscape-level restoration by beginning with its top-of-watershed approach (Habitat Restoration Management Plan (HRMP), section 1.3.6). Restoring the upper reaches of a watershed allows for natural processes such as gravity and water and wind flow to disperse seed downhill. For any species recovery or habitat restoration work that begins while invasive Mule deer are still present, an exclosure will be necessary. The Conservancy will begin testing the application of herbicides at a landscape scale to test the efficacy of invasive seed bank reduction on the landscape (HRMP 4.8). The Conservancy will then collect and begin bulking of native seeds for a low diversity cover crop plant palette (HRMP 4.5), develop

protocols for rare plant propagation, and continue invasive plant management (HRMP Appendix A).

2.2. Fence building

Since invasive Mule deer will remain on the landscape in the early stages of the Project, it will be necessary to install fencing to exclude them from active restoration areas—particularly in areas where native seeds are expected to germinate following invasive plant treatment. This is especially important for rare endemic species that have lost their natural defenses against herbivory. If a fence is not constructed, the native seed bank could begin to germinate and could inadvertently deplete many native plants above ground as well as in the soil seed bank. As part of the site preparation phase for long-term native habitat restoration, a targeted herbicide application strategy will be implemented across the fenced 10-acre site identified in Exhibit 1. This site has been selected because it is a high priority top of a watershed location identified in the HRMP (section 3.4) that would positively impact restoration efforts both downstream and Island-wide.

The aim is to complete the construction of the fence within the first quarter of 2026 so herbicide applications can begin afterward.

2.3. Initial Herbicide Application

The 10-acre active restoration location has a high density of invasive annual grasses, which severely limits native species recruitment and contributes to elevated wildfire risk, erosion, and degraded ecological function. Many of the planned active restoration sites have a high cover of invasive annual grasses which makes this location ideal to refine the Project's invasive plant treatment methodology. The initial herbicide treatment will consist of broadcast applications of Poast® (active ingredient: Sethoxydim), a monocot selective, post-emergent herbicide registered for use on wildland and restoration sites to control weedy C4 and C3 annual grasses, including *Brachypodium* spp., *Bromus* spp., *Avena* spp., and *Schismus* spp. All of these species have benefited from the presence of invasive Mule deer on the Island. Applicators may shift herbicide use to a similar monocot specific herbicide if needed. Poast® herbicide specifically targets grass species without significantly impacting broadleaf plants or native forbs. These monocot selective herbicides, do not contain a surfactant and will be mixed with a crop oil concentrate such as Agridex® (active ingredient: Paraffinic oil, ethoxylated sorbitan fatty acid ester, sorbitan fatty acid ester) or a methylated/modified seed oil such as Glacier-EA® (active ingredient: Methylated seed oil, Polyoxyethylene polyol fatty acid ester and Butyl lactate) as necessary based on the herbicide label instructions.

- Application Method: Herbicide will be applied using a UTV-mounted boom sprayer for efficiency and even coverage over large areas. Spray rigs are calibrated to ensure application rates are consistent with the label rates. All herbicides will be applied by trained applicators and in accordance with all California Department of Pesticide Regulation and County of Los Angeles Agricultural Commissioner regulations.
- Frequency: two or three applications per growing season, depending on precipitation timing and target species phenology, will be implemented for three consecutive years. Variable precipitation could result in fewer or greater applications if necessary. Intervals will follow best practices to align with invasive grass emergence and seed set stages. Application will not occur during conditions that are not conducive to application (high winds, high temperatures, etc.)
- Timing: Treatments are expected to occur between February and May, depending on seasonal rainfall and grass growth stages.

To address the possible post-treatment issue of secondary invasion by non-native forbs, a randomized experimental plot design will be implemented within the 10-acre site. In plots where invasive forbs establish dominance following grass suppression (e.g., *Brassica nigra*, *Hirschfeldia incana*, *Erodium* spp., etc.), a broad-spectrum herbicide, such as glyphosate, or a broadleaf specific herbicide, such as triclopyr, may be used in accordance with label guidelines and under appropriate environmental conditions.

To evaluate the effectiveness of different herbicide treatments in controlling invasive plant species within a 10-acre exclosure, the Conservancy will use a randomized block design with replication. The experiment will compare a monocot-specific herbicide, a broad-spectrum herbicide, and a no-treatment control over three years to determine the most effective approach for site preparation in large-scale restoration.

Design Overview

- Design Type: Randomized Block Design
- Location: 10-acre exclosure
- Number of Treatments: Three
    1. Treatment A – Monocot-specific herbicide (e.g. Poast, active ingredient Sethoxydim)
    2. Treatment B – Broad-spectrum herbicide (e.g. Rodeo, active ingredient Glyphosate)

3. Treatment C – No-treatment control

- Number of Blocks: 20
- Replication: Each treatment will be applied once per block, resulting in 20 replicates per treatment.

The 10-acre site will be divided into 20 equal-sized blocks arranged in a grid pattern, with each block measuring approximately 0.5 acres. Each block will contain three treatment plots, randomly assigned to Treatments A, B, or C. This layout ensures that environmental variation (e.g., soil type, slope, moisture) is accounted for by distributing treatments evenly across the site. The treatments are listed below.

1. Treatment A – Monocot-specific herbicide
    - Product: Sethoxydim (Poast)
    - Application Rate: 1%–1.5% in solution
    - Adjuvant: Crop oil concentrate or methylated seed oil at 1%
    - Potential for two separate application rates (1% and 1.5%) if differences are expected to be meaningful.
2. Treatment B – Broad-spectrum herbicide
    - Product: Glyphosate (Rodeo)
    - Application Rate: 2% solution
    - Adjuvant: Approved surfactant at label rate.
3. Treatment C – Control
    - No herbicide application.
    - Standard monitoring for natural changes in vegetation cover.

Herbicide will be applied via UTV-mounted spray rig to ensure consistent coverage. Applications will follow label instructions and be conducted under suitable weather conditions to minimize drift. All applicators will hold a Qualified Applicator License (QAL) or have been trained by a Conservancy QAL holder.

Example of treatment rotation within blocks:

Block	Plot 1	Plot 2	Plot 3
1	A	B	C
2	B	C	A
3	C	A	B
…	…	…	…
20	A	C	B

All herbicide applications will be monitored annually and will rely on the monitoring plan outlined in the monitoring section of this document. The herbicide program will be monitored annually for efficacy, plant community response, and soil disturbance. Data collected will inform adaptive adjustments to:

- Application frequency and rates
- Need for subsequent herbicide treatments
- Timing of native seed introduction

All applications will comply with label requirements, pesticide handler safety standards, and reporting obligations to the LA County Agricultural Commissioner.

2.4. Collect Low Diversity Cover Crop Plant Palette for Application

Low diversity cover crop plant palette native seed collection and bulking will be implemented to support the re-establishment of native vegetation following invasive species removal and to provide a genetically appropriate, island-adapted seed source for restoration seeding (HRMP 4.5).

Wild seeds collected during this phase will be used to implement native seeding at the fenced 10-acre site identified in Exhibit 1. Following invasive species treatment, this site will serve as the first application area for early colonizer native species selected for their ability to rapidly establish on degraded soils, suppress invasive annual grasses, and initiate early-stage recovery processes (HRMP 4.5.6). These species function as short-term native cover while longer-term successional dynamics reestablish. However, some late successional species, such as endemic buckwheats, colonize sites early after ungulates are no longer a threat, as observed in past exclosures.

Seeds will be sourced from native plant populations across Santa Catalina Island to preserve the genetic diversity and ecological specificity of the Island's flora (HRMP 4.5.2). Collected material will be used for both direct broadcast seeding and propagation. Seedlings will be grown at the Conservancy's Ackerman Native Plant Nursery to support container-based outplantings (HRMP 4.11). To meet volume needs for restoration seeding, wild-collected seed may be bulked through professional seed bulking contracted off-Island (HRMP, 4.5.5). Seeds will be collected according to phenology. Table 1 highlights the anticipated periods when seeds of various species will be ripe for collection.

Low Diversity Cover Crop Plant Palette Seed Collection Calendar												
								=Species bloom period				
								=Seed collection period				
								=Bloom and collection				
Species	J	F	M	A	M	J	J	A	S	O	N	D
Achillea millefolium												
Acmispon argophyllus var. argenteus												
Acmispon dendroideus var. dendroideus												
Artemisia californica												
Baccharis pilularis ssp. consanguinea												
Encelia californica												
Eriogonum giganteum var. giganteum												
Isocoma menziesii												
Stipa pulchra												

Table 1. Seed collection phenology calendar.

Seed collection will follow established permitting and access requirements. The Conservancy will follow ethical collection protocols aligned with guidance from the Center for Plant Conservation and California Botanic Garden (CPC, 2019).

Seed Mix Composition: The restoration mix will include a standardized blend of disturbance-adapted species (HRMP Table 3-3). All taxa are native or endemic to Catalina Island and selected based on functional traits such as rapid establishment, regenerative ability, and ecological compatibility with early post-treatment environments.

- *Achillea millefolium* – yarrow
- *Acmispon argophyllus* var. *argenteus* – Channel Islands silver lotus
- *Acmispon dendroideus* var. *dendroideus* – island broom
- *Artemisia californica* – coastal sagebrush
- *Baccharis pilularis* ssp. *consanguinea* – coyote brush
- *Deinandra fasciculata*
- *Diplacus puniceus*
- *Encelia californica*
- *Eriogonum giganteum* var. *giganteum* – Saint Catherine's lace
- *Eriogonum granda* var. *grande*
- *Isocoma menziesii* – Coast goldenbush
- *Stipa* spp. – Needlegrass

Seed Phenology Tracking: Collection timing will be based on species-specific bloom and seed maturation periods using Calflora records and Conservancy staff observations. A working phenology calendar is maintained by the Conservancy team and used to guide seasonal scouting and harvest planning (Table 1).

Collection Methodology: Seeds will be collected from wild populations across Catalina Island, prioritizing healthy, phenologically ready stands with sufficient seed yield (HRMP 4.5.2). A maximum of 10% of available seed will be collected per population. Cut tests will be used to assess viability prior to collection, and maternal lines will be tracked using field forms and ArcGIS Field Maps.

Labor and Training: Seed collection efforts will draw on a combination of Conservancy staff, contractors, volunteers, and workforce development partners. All labor sources will support field planning, wild collection, and transport of materials to the nursery or off-Island facilities. Training will be scaled to experience level and will include field safety, collection ethics, plant identification, phenology, seed handling and transport, and species-specific collection methods. Safety instruction will cover radio use, wildlife

awareness, equipment handling, PPE, and working in heat. Ethical training will emphasize low-impact practices—limiting the percentage of seed collected, avoiding trampling, and protecting plant populations. Pre-field instruction may include educational workshops, naturalist training, and review of standard procedures. In-field learning will be supported by ID guides, herbarium specimen collection, and staff supervision. Teams will practice manual and mechanical collection techniques, data recording, and follow protocols for safe handling of species that require collection at height. The Conservancy is also in discussion with Native Seed Group to provide additional field services and expertise. Their team is experienced in wildland seed collection and can bulk material off-Island to support large-scale application and supply the on-Island seed farm.

2.5. Bulk Low Diversity Cover Crop Plants

Processing and Storage: Most target species produce orthodox seeds suitable for mid-term storage in dry, shaded environments (HRMP Appendix F 4.1.2). Collected seed will be air-dried and processed using species-appropriate methods (e.g., sieving, air-blowing, rubber mat separation). *Baccharis pilularis* will be used immediately due to limited viability in storage.

Cleaning the seed of inert material reduces the chances of rotting or molding of the seed. The amount of seed cleaning that is needed will depend on the harvesting method for the seed, how much inert material is present, the desired purity of the seed, and the seeding method to be used with some methods requiring a higher degree of cleaned seed. For optimal cleaning, a seed cleaning machine should be used.

Threshing to dethatch the seed from any flower stalks or seed heads will be conducted. Many different tools can be used for this process such as mechanical threshers or hammer mills, or threshing can also be done by hand methods for smaller quantities of seeds using creatively produced, handheld implements that can remove the seed from stalks. The second step is winnowing or sieving the seed through a series of screens to remove chaff, other plant material, weed seed, and empty seed hulls.

Seed processing equipment includes a Clipper Office Tester, an Oregon seed blower, a brush deawner, a dissecting scope, a Mettler scale, storage space for seed being processed, and miscellaneous equipment for seed processing, tracking, and propagation including vacuum desiccators, silica, sieves, mesh screens, and plant tags. Other equipment includes precision hand tools (I.e. scalpels, brushes, tweezers, scribers), a rock tumbler to prep seeds for sowing, a blender, a dough roller to break down tough shells, and wooden blocks with rubber attached to remove fleshy portions of the fruit. A dehumidifier

to reduce relative humidity down to ~20% assists with desiccation of seeds being processed.

Seed Bulking Strategy: Collected seed will be used for both direct application and propagation. Container plants will be grown at the Conservancy's Ackerman Native Plant Nursery and will be used for both on-Island seed bulking and for landscape installations of taxa that do not reproduce as effectively from seed. Off-Island contractors will lead bulk seed increase over multiple years starting from small wild collections that will follow California Native Plant Society standards (no more than 10% of seed from a given population collected in a given season and <5% for rare plants), as the implementation of Conservancy seed bulking operations will occur on a separate timeline form the initiation of the 10 acre exclosure in Exhibit 1. Partners will be critical to building the volume needed for restoration-scale application, including future seeding phases beyond Exhibit 1.

Seed bulking will be completed in conjunction with the implementation of adaptive invasive plant management. Once weed management thresholds have been assessed through monitoring and determined to meet the criteria for seed application, the low diversity cover crop plant palette in Table 1 will be applied to the landscape.

2.6. Apply Low Diversity Cover Crop Plant Palette Natives to Landscape

Seeding Rates and Quantities: The average target seeding rate is 35 lbs/acre, yielding approximately 100 seeds/sq ft. All final application rates will be adjusted using pure live seed (PLS) calculations based on lab testing. PLS metrics will be matched to individual species and composition of the low diversity cover crop plant palette seed mix can be varied to best achieve desired germination and landscape representation.

Seed installation can be achieved by several methods, including drill seeding, imprint seeding, broadcast seeding, hydroseeding, and seed ball technique (HRMP Appendix F 6). The determination of seeding method will be dependent upon site conditions and accessibility. Larger sites that are accessible by equipment can be efficiently seeded mechanically with a drill seeder, imprint seeder, hydroseeder, or broadcast seeder. Smaller sites, sites with a high density of native species, or with unavoidable populations of sensitive species can be seeded (optimally during the fall season) by hand broadcast (either by hand or with a hand operated seed disperser) or the seed ball technique.

The application will be done in conjunction with precipitation cycles to best facilitate the germination of applied low diversity cover crop plant palette seed mixes (HRMP Appendix F 6.7). Germination on the site will be monitored for desired species and compositional outcomes, and composition and application methodology will be varied if initial results are not desirable for appropriate vegetation community progression.

2.7. High Diversity Seed Mix Bulk and Application

In 2032, within the 10 acre exclosure, a high-diversity seed mix will be added to the area. To prepare for this application, the high diversity seed mix will start being collected and bulked in 2029 using the same methodology outlined in the low diversity seed mix above. The seed mix may contain any of the plants in Table 2. Some plants which prove to be too difficult to bulk can instead be planted in strategic nodes that are easily accessible for watering. Seeds that may be susceptible to genetic admixture off-Island will be bulked on-Island at the Conservancy's seed farm, but for other species with low risk of genetic admixture, the Conservancy will bulk off Island.

Plant Identification	
Scientific Name	**Common Name**
Acmispon argophyllus var. argenteus	Channel Island silver lotus
Allium praecox	wild onion
Arctostaphylos catalinae	Catalina manzanita
Artemisia douglasii	mugwort
Calystegia macrostegia	island morning glory
Calochortus catalinae	Catalina mariposa lily
Ceanothus arboreus	feltleaf ceanothus
Ceanothus megacarpus var. insularis	Island bigpod ceanothus
Cercocarpus traskiae	Catalina mountain mahogany
Comarostaphylis diversifolia ssp. planifolia	summer holly
Constancea nevinii	Catalina silverlace
Crocanthemum greenei	island rush-rose
Crossosoma californicum	California rockflower
Dendromecon harfordii	island bush poppy
Dichelostemma capitatum	blue dick
Diplacus puniceus	southern monkeyflower
Elymus condensantus	giant wild rye
Epilobium canum	California fuchsia
Eriodictyon traskiae	Trask's yerba santa
Eriogonum giganteum var. giganteum	Saint Catherine's lace
Eriogonum grande var. grande	island buckwheat
Eriophyllum confertiflorum	golden yarrow
Euphorbia misera	cliff spurge
Galium catalinense	Catalina bedstraw
Gambelia speciosa	island snapdragon
Heteromeles arbutifolia	toyon
Keckeillia cordifolia	heartleaf penstemon
Lepechinia fragrans	fragrant pitcher sage
Leptosyne gigantea	giant coreopsis

Lonicera subspicata var. subspicata	southern honeysuckle
Lupinus spp. (albifrons, bicolor etc.)	lupine
Lycium californicum	California boxthorn
Malacothamnus fasciculatus var. catalinensis	Catalina island bushmallow
Malosma laurina	laurel sumac
Malva assurgentiflora ssp. glabra	southern islands mallow
Cleomella arborea	bladderpod
Pentachaeta lyonii	Lyon's pygmydaisy
Prunus ilicifolia ssp. lyonii	island cherry
Quercus engelmannii	Engelmann oak
Quercus pacifica	island scrub oak
Quercus tomentella	island oak
Quercus x macdonaldii	Macdonald oak
Rhamnus pirifolia	island redberry
Rhus integrifolia	lemonade berry
Ribes viburnifolium	Catalina current
Salvia apiana	white sage
Salvia mellifera	black sage
Scrophularia villosa	Catalina figwort
Stipa pulchra	purple needle grass
Solanum wallacei	Catalina nightshade
Xylococcus bicolor	mission manzanita

Table 2. High diversity seed mix.

Application will also follow the same methodologies outlined in the low-diversity section. The only difference being that nodes of plants to difficult to seed will be added to the landscape in nodes. These nodes will be watered for the first two years after planting when rain isn't present. Plantings will be monitored for survivorship within these nodes.

2.8. Expand Invasive Plant Treatment Beyond Exclosures

The 10-acre exclosure serves as a strategically located and accessible core treatment node for the initiation of large-scale invasive plant management on Catalina. Its location allows for concentrated, controlled trials of various management techniques, ensuring that methods are both ecologically effective and operationally feasible before scaling up. This site will serve as a testing ground to refine herbicide application strategies, evaluate the efficacy of treatments, and develop best management practices that can be applied across more complex or sensitive landscapes.

Once management approaches have been tested, optimized, and demonstrated to produce reliable results, the Project will expand outward to encompass the remaining 105 acres identified within the planned Top of Watershed Program (Exhibit 2). This phased

approach will allow us to reduce uncertainty, manage resources efficiently, and minimize potential risks associated with scaling up too quickly. Once the 105 acre program has been started successfully, attentions will turn to the 100 acre restoration site in Haypress (Exhibit 3). Each location on the Island will be chosen in three acre increments which follows the three years of herbicide, three years of low-diversity native cover crops, and finally the high diversity seed mix.

To maximize efficiency and minimize environmental disturbance, helicopter-based herbicide application will be utilized for the broader landscape treatment when appropriate. All aerial applications will be conducted in consultation with the Los Angeles County Agricultural Commissioner to ensure compliance with local regulations and best practices. Licensed applicators holding both a Qualified Applicator License (QAL) and a Pest Control Aircraft Pilot certification will perform the work, ensuring the highest standards of safety, precision, and regulatory compliance. Helicopter application will allow targeting of invasive plant populations across rugged, otherwise inaccessible terrain, applying herbicide with accuracy and speed while reducing the need for ground-based mechanical disturbance.

3. Biosecurity Measures in Place to Reduce Threats to Ecosystem

3.8. High Priority Invasive Plant Removal

Through the Catalina Invasive Plant Program (CIPP), a twenty-plus year-old program that has supported intensive high priority invasive plant management across Catalina, the Conservancy will continue to manage, mitigate, and work to prevent introductions of invasive plants. The details of the CIPP plan are found in the HRMP Appendix A. The goals of the CIPP are as follows (Knapp, 2007):

1. Prevent the reduction or loss of native Catalina flora and fauna, due to the direct or indirect impact(s) caused by invasive plants, by actively managing invasives with the safest, most effective and economical methods available.
2. Increase the Conservancy's and partner agencies' knowledge regarding invasive plant distribution, impacts and management strategies.
3. Stop invasive plant introductions, establishment and spread on Catalina by increasing invasive plant awareness in staff, contractors, residents, and visitors through education programs, and improving cultural practices and partnerships.

Effectively managing well-established invasive species populations through long-term programs requires substantial financial investment and resource allocation, underscoring the importance of strategic prioritization in selecting which species to target for control efforts. To allocate limited resources effectively, the Conservancy focuses on species that

pose the most significant threats to native ecosystems and have the greatest potential for successful management (Mullin et al., 2000).

Efficient management of invasive plants relies on accurately predicting susceptible species and locations, while employing robust control tools. This strategic prioritization requires understanding each species' ecological impact, distribution, and control potential. By focusing on high-impact, rapidly expanding species, land managers can effectively allocate resources to protect native habitats. A well-informed, data-driven prioritization process ensures efficient use of limited conservation resources, enabling professionals to make targeted decisions that preserve native ecosystems and promote long-term environmental health (APRS Implementation Team, 2000).

The goal of active invasive plant management species is currently achieved through four objectives:

1. Early Detection and Rapid Response (EDRR) to detect, monitor, and eradicate new invasive plant introductions before it can spread.
2. Eradication of all known populations on the Island, or from natural areas, of species that have significant ecological impacts and are feasible to eliminate.
3. Control of widespread invasive species too common to be eradicated will be reduced in high priority watersheds, restoration areas, and high use areas.
4. Control of widespread species too common to be eradicated that occur along dispersal corridors, such as roadways and trails that have the potential to spread invasive plant propagules.

3.2. Annual Island-Wide Fox Monitoring 2026-2036

Trapping Schedule and Design: Each year from 2026 to 2036, the Conservancy will conduct a six-week systematic Island-wide fox trapping survey. The survey is conducted across 216 road-accessible trap locations spanning both the East End and West End of the Island, arranged into six traplines with between 32 and 41 traps per line (Exhibit 3). Each trapline is active for four consecutive nights before being closed and sterilized *(totaling approx. 864 trap nights per year).* Trapping design accounts for spatial representation, logistical access, and is in accordance with historical annual trapping efforts that have been conducted on the Island since 1999. Occasional target trapping will also take place in other locations across the Island.

Foxes are captured using modified Tomahawk #106 single-door live traps baited with dry and canned cat food and loganberry lure. Traps are outfitted with bite bars, shade cloth, and fine mesh to reduce injury, and are sterilized between deployments with Nolvasan®. The Conservancy will only conduct monitoring if federal permits through USFWS and CDFW are active.

Captured foxes are processed in under 20 minutes without sedation and released at the capture site. Each individual is permanently marked (if untagged) with a 12.5 mm passive integrated transponder (PIT) tag and evaluated for:

- Age class (based on tooth wear)
- Sex
- Body weight and condition
    - Administer subcutaneous fluids if necessary
- Reproductive status
- Eye status
    - Clean and open any infected eyes and apply optic ointment
- Ectoparasite load (fleas, ticks, lice)
    - Provide topical frontline if the infection is severe enough
- Ear mite severity, canal condition, and presence of tumor nodules (otoscopic exam)
- Visible injury, infection, or trauma (address what can be addressed in the field or bring the animal to the Veterinarian for more serious issues)
    - Application of topical or injectable antibiotics

A subset of foxes also receives blood draws (≤9 mL) for disease surveillance and collaborative research projects which may include but not limited to the collection of swabs, blood, ectoparasite, and/or fur samples.

Vaccination: All eligible foxes receive vaccinations using protocols developed by the Island Fox Working Group and previously validated through titer persistence studies. Vaccines are administered as follows:

- CDV: 1 mL intramuscular Purevax® Ferret CDV vaccine (left thigh)
- Rabies: 1 mL subcutaneous Imrab® 3 TF vaccine (right thigh)

All captured foxes also receive topical treatment for ear mites with Noromectin® (0.05 mL per ear). Ear canal condition and mite severity are scored during an otoscopic exam and recorded (Moriarty et al. 2015; Vickers et al. 2015).

Sentinel Collaring: A critical subset of the Catalina Island fox population is not vaccinated during trapping but instead fitted with radio collars and monitored biweekly. These individuals serve as sentinels for early detection of disease emergence. Selection criteria for collaring include:

- Adult foxes weighing ≥2.0 kg
- No vaccine administered during current or prior year's trapping

- Preference for younger individuals with naïve immune systems when possible

Foxes selected for collaring are fitted with Holohil Systems Ltd. VHF radio collars (39 g, <2% of body weight) equipped with:

- 12-hour mortality sensors
- Reflective tape for enhanced nighttime visibility
- Unique tape banding combinations for individual field identification

When a mortality signal is detected, field personnel recover the collar and carcass as quickly as possible to assess cause of death. If the fox is not too decomposed, fresh remains are submitted to the California Animal Health and Food Safety Laboratory (CAHFS) at UC Davis for necropsy.

3.3. Infectious Fox Disease Surveillance

Infectious disease remains one of the greatest threats to the long-term viability of the Catalina Island fox (fox) population, as demonstrated by the catastrophic 1999 Canine Distemper Virus outbreak. Surveillance is conducted annually during Island-wide trapping using serological sampling, targeted radio-collar monitoring (biweekly), and collaboration with external research partners.

Sample Collection and Laboratory Analysis: Blood samples (≤9 mL) are collected from a subset of captured foxes during annual trapping efforts, with selection stratified by age, location, and vaccination status. Serum samples are sent to the New York State Animal Health Diagnostic Laboratory at Cornell University, where they are tested for antibodies against five key canine pathogens:

- Canine Distemper Virus (CDV)
- Canine Adenovirus (CAV)
- Canine Parvovirus (CPV)
- Canine Coronavirus (CCV)
- Canine Herpesvirus (CHV)

Serological assays include:

- Serum Neutralization (SN) tests for CDV, CAV, CCV, CHV
- Hemagglutination Inhibition (HI) for CPV

Titer thresholds for past exposures are considered:

- SN ≥ 1:16 for CDV, CAV, CCV, CHV

- HI ≥ 1:80 for CPV

3.4. Fox Mortality Monitoring and Threat Reduction

Tracking known mortality is essential to understanding the ongoing threats facing the fox and informing targeted management actions. Mortality monitoring is conducted through a combination of radio telemetry, public reporting, carcass recovery, and necropsy. Data are reviewed annually to identify trends in cause of death, assess the effectiveness of mitigation efforts, and determine whether thresholds for adaptive response have been exceeded

Mortality Detection and Investigation: Mortality events are detected through VHF radio telemetry and public reporting. All sentinel foxes fitted with Holohil collars are monitored on a biweekly basis using both vehicle and aerial surveys. Collars emit a mortality signal if no movement is detected for ≥12 hours. Upon receiving a mortality signal or report from the public, Conservancy staff recover the carcass and conduct a preliminary field assessment, including documentation of condition, location, and probable cause of death.

When cause of death cannot be confirmed in the field carcasses are submitted to the California Animal Health and Food Safety Laboratory (CAHFS) at UC Davis for full necropsy. Necropsy findings are used to track emergent threats (e.g., toxicants, predation) and guide future biosecurity or enforcement actions.

Public Reporting and the Fox Hotline: To improve mortality detection and public response, the Conservancy launched a dedicated Fox Hotline in 2024. The hotline received 41 reports during the year:

- 53.7% reported injured foxes
- 36.6% reported mortalities
- 9.8% reported behavioral concerns

Of these, 7.3% resulted in humane euthanasia following evaluation at the Animal Clinic of Catalina.

Public outreach, including informational flyers and information about the fox hotline, is also an important part of the Conservancy's threat mitigation.

3.5. Invasive Mule Deer

Invasive mule deer removal on Catalina will be conducted by contractors using humane, ground-based culling techniques. In the early stages of the Project, the Conservancy will focus on testing bait as a tool for removal of deer, and harvesting of any deer dispatched for

the California Condor Project (pending funding). Separately, the Conservancy will continue to use the Private Lands Management Program for locals and tribes to recover meat (if either is interested) during the in phases of the Project. As the Project progresses and the work becomes more challenging, carcasses will be moved away from locations visible to the public and left to naturally recycle nutrients back into the environment.

Sterilization will be a minor part of the deer removal effort. The operation will be performed exclusively by a licensed veterinarian and will be limited to invasive Mule deer the public wishes to retain, as well as sentinel animals in the early phases of the Project. Helicopters will be used as a support tool only - not as a platform for killing via a firearm. Contractors and detection dogs will be transported via helicopter to:

- access remote locations
- decrease travel time to ensure contractors and detection dogs can maximize cooler daytime temperatures to reduce heat stress and fatigue
- maximize daylight hours when there are fewer people on the landscape as a safety measure
- survey for invasive Mule deer

No animals will be dispatched from helicopters.

A range of tools and strategies will be employed to ensure complete population removal. These include baiting, day and night shooting by contractors, surgical sterilization, net capture (aerial and ground-based), and detection dogs. Although no invasive Mule deer will be dispatched from an aerial platform, i.e. helicopter, helicopters will be used as a support tool for detection and net capture. Aerial tools will be used primarily in remote, hard-to-reach areas. This will be followed by humane euthanasia performed by trained professionals on the ground. This technique will also be employed to capture and relocate sentinel invasive Mule deer that will help locate remaining non-sentinel invasive Mule deer across the Island.

Detection dogs will be used to find invasive Mule deer. They will remain under the control of their handlers at all times to ensure safety and avoid disturbance to other wildlife. All dog teams will be trained in advance to target only invasive Mule deer, minimizing the risk of incidental take. Aerial transport will be used to return dog teams to base efficiently, preventing fatigue and heat stress, and allowing for rapid redeployment when needed.

Invasive Mule deer removal will occur in stages; the first stages includes contractors using baiting and watering sites to attract invasive Mule deer to dispatch the animal. Once the invasive Mule deer population has been further reduced, the Conservancy will rely on thermal ground shooting with the aid of aerial netting and drones to assist in finding the

deer. This is followed by ground shooting with detection dogs aiding to find invasive Mule deer. This will be followed by ground shooting relying on sentinel animals and detection dogs until all invasive Mule deer not selected for sterilization are removed from the Island.

The methods will follow the American Veterinary Medical Association's stringent guidelines for humane handling and euthanasia of animals or the AVMA Guidelines for the Depopulation of Animals. No snares or poison would be used for the Project, relying on the most humane removal methods possible and every effort would be made to dispatch animals with a single shot. Any invasive Mule deer wounded during shooting would be followed and immediately dispatched.

The following specific culling procedures will be adhered to:

1. Prior to initiating any field activities, the target area/s and surrounding properties are thoroughly surveyed using digital aerial imagery followed by field confirmation.
2. Occupied structures will not be shot towards, and operators will be in regular communication with owners that are proximate (<100 m).
3. Field operations occur during hours of lowest human activity. Advance notice of location and time of work will be communicated to parties (i.e., leaseholds, landowners, and residents) directly impacted. In addition, during culling operations the contractor will search intensively for people and non-target animals to avoid unsafe conditions. Areas surrounding operations will be continuously surveyed using hand-held thermal optics to search for humans and non-target animals.
4. During invasive Mule deer removal operations there will be continuous open communication between the Conservancy, local law enforcement, and the contractor to keep people well informed regarding field activities to avoid conflicts.
5. Proper topography or elevation will always be used to provide a safe earthen backdrop. In urban environments, elevated positions will be utilized to provide an earthen backdrop.
6. Dispatch operations will cease immediately if unsafe conditions (e.g., unauthorized personnel in operational areas) are encountered and will not be resumed until conditions are deemed safe.

4. Monitoring and Documentation

Monitoring is a cornerstone of the Conservancy's Project. It allows the Conservancy to evaluate progress, adapt management actions to real-time ecological responses, and ensure long-term ecosystem resilience. This plan outlines four key monitoring initiatives: Island-wide vegetation and wildlife monitoring (HRMP 5.3.2 & 5.3.4), a targeted lepidoptera

biodiversity survey (HRMP 5.3.5), and site-specific restoration monitoring at the 10-acre Exhibit 1 restoration site (HRMP 5.2).

4.1. Fox annual reporting and adaptive management

Each year, all data collected through Island-wide monitoring, telemetry, mortality investigations, and disease surveillance are synthesized into an integrated review. This process includes:

- Annual data analysis of demographic trends, spatial use, and health indicators
- Comparison to historical baselines
- Identification of anomalies or emergent concerns (e.g., clustering of mortalities, parasite burdens)

Annual trends, emergent research, and management best practices are shared across the six islands with island foxes at the annual Fox Working Group Meeting. This synthesis forms the basis for determining whether current monitoring protocols remain appropriate or if adaptive changes are required.

As part of the Catalina Island Fox Conservation Agreement and associated regulatory frameworks, the Conservancy provides annual reporting to relevant agencies and collaborators, including:

- California Department of Fish and Wildlife (CDFW)
- U.S. Fish and Wildlife Service (USFWS)
- Island Fox Conservation Working Group
- Funding entities and nonprofit partners

Deliverables include a detailed Annual Island Fox Report and species-specific updates within broader restoration technical reports.

All reports are archived in the Conservancy's central data repository and made available to agency partners upon request.

4.2. Measure changes to active restoration sites

The 10-acre fenced exclosure outlined in Exhibit 1 will serve as a pilot site for intensive invasive species control and passive restoration which will be expanded to 105 acres after three years and the Haypress site after six years (Exhibit 2 & 3). Monitoring here will guide adaptive herbicide use and determine readiness for native seeding. Once native seeding begins, the Conservancy will use this methodology throughout to measure effectiveness of native seeding.

Monitoring will use line-belt transects (typically 10 m x 1 m) placed systematically throughout sites. The sites will be monitored before and after treatments to establish a baseline. Within each transect, the percent cover of native vs. non-native species will be recorded, alongside species richness and dominance.

Data will be linked to specific treatment areas (e.g., selective vs. broad-spectrum herbicide plots) in a randomized block design, allowing for evaluation of treatment efficacy over time. Permanent photo points and drone imagery will be used to document visible changes in vegetation structure and bare ground cover over time.

Soil Conditions: Optional assessments may include soil compaction, organic matter, or erosion metrics if funding and staffing allow.

4.3. Island-Wide Lepidoptera Survey

Land use changes on Catalina over the past 200 years, particularly the introduction of feral ungulates, have led to severe alterations in vegetation and, likely, the associated Lepidoptera species composition. Around 530 species of moths and butterflies are currently known to inhabit Catalina Island, of which many have not been identified to the species-level, and at least six species are island endemics (Powell 1994). With ongoing ungulate removal, there is promise that a more natural state can be reached, and native insect populations and species that depend on them can rebound and expand from the pockets of remaining native vegetation that act as refugia.

The Conservancy will conduct Lepidoptera surveys across watersheds of the Island, replicating the Island-wide lepidoptera survey methodology originally used by Dr. Jerry Powell to develop a database of species occurrence that builds on previous Island-wide checklists (Powell 2012). As the last ungulates are removed, these Lepidoptera surveys can provide important information about how vegetation recovery is impacting the flow of energy through the ecosystem. Butterflies and moths serve as indicators of climate response, habitat integrity, and ecosystem productivity.

Timing: One survey in spring (March–May) and one in fall (September–November) in 2026 and every three years after depending on funding.

Surveys: Surveyors will conduct both daytime butterfly transects and nocturnal UV-light trapping for moths at 20 locations across major vegetation type. Surveyors will also survey vegetation for caterpillars to cover as many species as possible and establish host-plant relationships. Caterpillars will be photographed alive, and a selection will be stored in 95% ethanol for DNA analysis. Surveys will also be conducted at night with UV light traps to collect most moth species. Moths collected in the traps will be frozen until returned to the lab, where they will be pinned and spread. A selection of morphotypes will be

photographed, and tissue (leg or abdomen) will be dissected for DNA extraction. Specimens will be identified to species-level where possible based on morphology and existing identification keys.

DNA Barcoding: DNA barcodes by first extracting DNA from tissue samples using a liquid handling robot available in the Conservancy's lab for optimal time and cost efficiency. The COI Barcode region will be amplified with PCR and universal primers for Lepidoptera and sequenced cost-efficiently using the Pacific Biosciences Revio platform. The Conservancy's lab routinely applies this method, which efficiently yields large batches of high-quality sequences. These sequences will be used to confirm species identification, identify any cryptic species found in Catalina Island, and provide a DNA reference database for future ecological studies.

Sampling Protocol: Each trap night will follow Powell's standardized protocol (e.g., trap start at dusk, 4–5 hours per site, fixed wattage UV light in protected mesh containers).

Deliverable: A comprehensive species list, photographic sampling, and habitat notes.

4.4. Report on Key Findings on Restoration Project

All monitoring data collected through this Project will be integrated into a robust adaptive management cycle to ensure restoration strategies remain effective, efficient, and scientifically defensible. This cycle will include annual data review, adjustments to restoration methodology, public and agency reporting, and curation of all monitoring records.

Every five years, data from vegetation surveys, wildlife monitoring, and site assessments will be analyzed in detail to evaluate progress toward restoration targets. This review will compare results against baseline conditions and identify any emerging trends or challenges.

Based on the findings, restoration practices will be refined as needed. This may include modifying herbicide application rates or timing, shifting seeding schedules earlier or later in the season, integrating erosion-control measures, or introducing supplemental plantings. In cases where restoration targets are exceeded, certain management activities may be scaled back to avoid over-intervention.

Results and management changes will be communicated to key stakeholders, including the California Department of Fish and Wildlife (CDFW), funding partners, and the public. Reporting tools will include detailed technical memos, GIS-based dashboards for spatial visualization of results, and annual summary presentations tailored to different audiences.

All monitoring records—raw data, processed datasets, spatial files, and interpretive reports—will be archived in the Conservancy's central data repository. This secure and well-organized archive will ensure that information is readily accessible to agency partners, collaborators, and researchers upon request.

A centralized annual summary document will synthesize the year's monitoring results, highlight conclusions, outline adaptive management adjustments, and capture key lessons learned. Over time, this record will serve as both a scientific resource and a practical guide, allowing the Conservancy to share insights and strategies with the wider conservation community, supporting restoration efforts beyond Catalina Island.

4.5. Landscape level monitoring across 60 plots

To capture long-term ecological trends, the Conservancy will revisit 60 legacy vegetation monitoring plots (Exhibit 5) first established nearly 20 years ago (HRMP 5.3.2). These plots were previously assessed under historic vegetation mapping and habitat condition assessments and represent a range of elevations, aspects, and habitat types across the Island.

Methodology: Each plot will be sampled using the point-intercept method on permanent transects, recording vegetation hits at fixed intervals (e.g., every 50 cm) to generate estimates of species cover, richness, and composition. The point-line intercept method consists of a transect with two points (A and B) thirty meters apart. Two pieces of rebar will be hammered into the ground and covered in white PVC pipes delineating the two points. A measuring tape will then be stretched thirty meters from the A point to the B point. The vegetation will be recorded every thirty centimeters across the thirty-meter tape for a total of a hundred measuring points. A hiking pole is marked as a centimeter ruler and then placed vertically across the measuring tape, and every plant touching the pole is identified to the specific epithet level. The canopy (the highest plant at that point) height is measured. At each point, monitors will identify each plant that touches the measuring rod, and for woody vegetation, the height and age class. The substrate of each transect will be recorded.

Recorded Data: In addition to the point-intercept data, a list of all plant species observed within a one-meter buffer on the uphill slope of the 30-meter tapeline and any additional species within a five-meter buffer on either side will be recorded. For all rooted shrubs within one meter of the tapeline on the uphill side, the number of individuals will be recorded with notes on their various life stages. The same notes will be taken for rooted trees within five- meters on either side of the tapeline while also measuring the diameter-at breast- height (DBH) of the largest size class trees in the established boundary. From this combined data, the Conservancy can accurately calculate and assess changes in the

percent coverage of species, native and non-native plant species richness, plant community structure and composition, diversity, etc.

Stratification: The selected sampling sites will be stratified by slope, elevation, vegetation type, distance from roads, and distance from other points. Samples will be divided between low elevation areas in drainages as well as ridge lines and hillsides. Additional sample points may be added as needed in areas with active restoration or if a particular habitat is underrepresented. It is recommended that each of the key vegetation habitat types is represented in the sample points, which include island chaparral, island scrub oak chaparral, coastal sage scrub, maritime cactus scrub and grassland.

Monitoring Schedule: Monitoring will be conducted in late winter to early summer depending on weather variables and plant phenology to capture the vegetation characteristics at the height of the growing season.

Methodology Alignment and Collaboration: The vegetation transect sampling techniques will align with the transect monitoring protocol used by the Channel Islands National Park to allow for a larger comparison among California Pacific Islands. Where appropriate, vegetation rapid assessments will be conducted in addition to transects and will follow the current California Native Plant Society – California Department of Fish and Wildlife Protocol for Combined Vegetation Rapid Assessment and Relevé, which was last updated April 2016.

Purpose: This data will establish a quantitative 2026 baseline to compare with historical data, inform ecosystem change analyses, and prioritize restoration needs.

Deliverable: A GIS-linked dataset and map layer of vegetation composition, disturbance, and presence of special-status plant species.

4.6. Bird Acoustic Surveys

As part of the Project, the Conservancy has developed a long-term monitoring strategy for measuring the response of bird species to restoration activities (HRMP 5.3.4).

Ground- and mid-story nesting species are expected to show the most rapid population response to invasive Mule deer removal and restoration activities, since invasive Mule deer browsing disproportionately affects understory vegetation, which is essential for many breeding bird species during the nesting season (Chollet et al. 2014).

Acoustic monitoring provides a non-invasive, scalable method to document changes in bird community composition and relative abundance over time, enabling the Conservancy to link restoration interventions to breeding bird responses.

The Conservancy will monitor up to 35 core acoustic stations, supplemented by additional stations in areas with current or planned habitat restoration activities (Exhibit 6). Sites were selected using stratified random sampling from a pool of locations with past or planned vegetation monitoring, ensuring coverage of multiple habitat types and restoration stages. Some sites will be located near exclosures to provide direct comparisons of vegetation and avian community structure. To reduce noise interference and potential recorder theft, stations will be placed at least 20 m from secondary roads and 50 m from primary roads, positioned to face the most open habitat available.

Acoustic Recorder Deployment: At each site, a single Audiomoth recorder will be mounted on an expandable pole approximately 1.8 m (6 ft) high. Recorders will be positioned away from trees to avoid leaf rustling and aimed toward the most open area. Recorders will be programmed to run between 0500–0900 hours (peak morning chorus) and 1900–0000 hrs (evening activity), aligning with breeding season vocalization peaks while optimizing battery life. All units will be deployed in early May and remain in the field for a four-week sampling period.

Habitat Data Collection: At each site, the Conservancy will collect vegetation structure and cover data annually during the acoustic deployment period. Metrics will include canopy height, understory density, shrub cover, and ground vegetation cover to link bird responses to habitat structure changes over time.

Target Species and Guilds: The Conservancy will analyze occurrence patterns for 4–6 focal species from each nesting guild:

- Ground nesters – e.g., San Clemente spotted towhee (*Pipilo maculatus clementae*)
- Mid-story nesters – e.g., Chipping sparrow (*Spizella passerina*)
- Canopy nesters – e.g., Catalina Hutton's vireo (*Vireo huttoni unitti*)
- Guild-level analysis will allow detection of differential responses to restoration and invasive Mule deer removal based on nesting height and habitat reliance.

Data Processing and Analysis: Audio files will be processed using BirdNET (Kahl et al. 2021), a machine-learning platform that identifies species from acoustic recordings. Data outputs will include species richness, species-specific occurrence rates, and guild-level presence/absence.

4.7. Shrew Surveys

The Santa Catalina Ornate shrew (also known as Catalina Island shrew; *Sorex ornatus willetti*) is the rarest endemic mammal on Catalina Island. First identified in 1941, it is an elusive species with only about 40 individuals observed since its discovery over 80 years ago. It is one of several subspecies of the ornate shrew that have a limited distribution. In

1986, the shrew was declared a Species of Special Concern by the California Department of Fish and Wildlife due to its restricted range, rarity, and the paucity of information concerning its life history.

This species serves as an indicator for understanding the health of ground-layer ecosystems. Its survival is linked to moisture-retaining shaded understory and intact leaf litter, conditions most consistently found in riparian corridors and lower elevation drainages. The extreme rarity and habitat sensitivity of the shrew make it especially valuable as a measure of restoration effectiveness in microhabitats—especially as invasive species removal, deer reduction, and native vegetation recovery progress.

Between 2006 and 2020, there were no shrew detections on the Island. In February 2020, the Conservancy placed remote cameras at all known historic shrew observations since 1941 (20 locations) and detected two individuals. Despite searching over 160 locations between 2021-2022, no additional shrews were detected. In 2023, the Conservancy expanded trapping effort to include live trapping with pitfall traps and Sherman traps. During the wet year in 2024, four shrews were detected via camera traps in two separate drainages on the windward side of the Island.

Core Monitoring Method: Camera Trapping: Given the species' small size, nocturnal behavior, and low detectability, remote camera traps serve as the primary long-term detection method for shrews. This method allows for minimally invasive, scalable monitoring that can operate seasonally or year-round in appropriate microhabitats.

Site Selection Criteria: Camera trap deployment is guided by microhabitat features documented in the 2023 shrew trapping report and historical detections. Key site selection attributes include:

- Dense leaf litter or understory vegetation for concealment and movement
- Habitat edges near riparian corridors or transitions between plant communities
- Moist soils that support invertebrate prey and soft substrate
- Shaded overstory conditions (e.g., oak woodland, mature coastal sage scrub)
- Sites are prioritized using fine-scale vegetation mapping and proximity to known or suspected shrew locations, with ongoing updates based on new detection

Camera Trap Configuration: Camera traps are constructed using 10-gallon buckets with integrated Reconyx Hyperfire2 cameras, with a target focal distance of 40 cm. All components are secured for long-term deployment and baited to increase shrew visitation. Specific setup procedures include:

- Create a vegetation-free ring in the soil using the bucket's outline
- Insert a stake-mounted tea strainer baited with live mealworms and grass
- Place a second stake-mounted plastic cup containing dried mealworms
- Secure both bait components using wire and a ground stake

- Replace the bucket over the site and stabilize using straps and perimeter rocks
- Capture documentation photos.

Cameras are programmed to take a three-photo burst upon motion detection. Camera servicing occurs on a rotating one to four-week schedule depending on weather and activity.

Optional Methodology (Contingent on Funding): If funding allows, the Conservancy may implement expanded detection through Sherman traps and pitfall traplines.

- Sherman Traps. Sherman traps are collapsible aluminum box traps designed for small mammal capture. On Catalina, each unit is:
    - Baited with a mix of dried mealworms, live mealworms, and oats
    - Supplied with poly-fill nesting material to retain body heat
    - Placed 5–25 meters from pitfall lines to target complementary microhabitat
    - Checked at defined intervals depending on environmental conditions and trapline accessibility Closed during daylight hours to prevent overheating or stress
- Pitfall Traplines: If funding allows, pitfall traplines serve as an expanded detection method for the Santa Catalina ornate shrew and are deployed in conjunction with drift fencing to intercept ground-dwelling small mammals. Traplines will consist of two-gallon buckets (depth = 24 cm) sunk flush with the soil surface and linked by drift fencing to direct movement.

Two configurations are used: 3.5-meter and 7-meter fence segments between buckets, all constructed with 1-ft-tall barrier fencing.

- Key trap components and bait setup include:
    - Live and dried mealworms, along with oats, placed within each bucket
    - A 1x1-inch sponge soaked in water for hydration
    - Shelter materials including poly-fill nesting substrate and a 5-inch PVC pipe segment as refuge

Traps are opened in the evening and checked at defined intervals depending on environmental conditions and trapline accessibility. All captures are processed and released at the point of capture. Trap success for shrews has been low but remains biologically important due to prior detections in similar habitat and methods.

4.8. Small Mammal Surveys

The Santa Catalina Island deer mouse (*Peromyscus maniculatus catalinae*) the Santa Catalina Island Harvest Mouse (*Reithrodontomys megalotis catalinae*), and the Santa

Catalina Island ground squirrel (*Otospermophilus beecheyi nesioticus*) subspecies are endemic to Catalina . The monitoring of small rodent populations has occurred consistently on the other Channel Islands over the last 20 years (Schwemm & Coonan, 2001), yet those on Catalina have been understudied. The most recent data collected on native mice was due to incidental captures in 2003-2004 by USGS while using pit-fall arrays to survey reptiles and amphibians (Baklin et al. 2004). There have not been any formal studies of the ground squirrel population on Catalina. The study of these animals will detect trends in endemic small mammal population dynamics especially in response to landscape restoration. Estimating native mouse density and abundance in various habitat types will allow these surveys to inform Island-wide population trends and be directly comparable to surveys conducted by the other Channel Islands and previous trapping efforts on Catalina (Ashley 1983 and Perlmutter 1986).

Monitoring of the Santa Catalina Island deer mouse and the Santa Catalina Island Harvest mouse will employ mark-recapture grids and opportunistically, consistent with current National Park Service, Channel Islands National Park protocols described in Fellers et al. (1988). Mice will be trapped via Sherman aluminum folding live capture traps. Trapping grids will be established Island-wide in various habitat types and be sampled as funding and personnel permit.

Sherman traps will be baited with rolled oats, peanut butter and dried mealworms, and will have bedding material for thermoregulation. Sherman traps will be opened in the late afternoon and checked first thing the following morning; they will remain closed during the day. All mice will be identified to species, aged, weighed, sexed, and tagged. Biological samples including blood, feces, swabs and hair/whisker samples may be taken. Tagging methodologies include non-toxic paint/markers, fur clippings, PIT tags and metal ear tags (National Band & Tag, style 1005-1), All small mammals will be released at the site of capture.

Monitoring of the Santa Catalina Island ground squirrel will employ mark-recapture efforts, similar to the methods from Baldwin et al. (2021) and Person et al (2024). Squirrels will be trapped in Tomahawk cage traps (combination of 13 × 13 × 46 cm and 15 × 15 × 61 cm traps; Tomahawk Live Trap, Hazelhurst, Wisconsin, USA) baited with rolled oats and peanut butter. Trapping grids will be established Island-wide in various habitat types and be sampled as funding and personnel permit.

Tomahawk squirrel traps will be open during the day and closed at night. Traps will only be left open while the weather remains favorable. All squirrels will be weighed, aged, sexed, and tagged. Biological samples including feces, swabs and hair/whisker samples may be taken. Tagging methodologies include non-toxic paint/markers, fur clippings, PIT tags,

VHF/GPS collars and metal ear tags (National Band & Tag, style 1005-1), All small mammals will be released at the site of capture.

Summaries of annual trapping efforts will be compiled into an annual report and will be shared with CDFW and maintained on the Catalina Island Conservancy repository. Small mammal population estimates, and trapping will only occur in years with funding on a 3–5-year cycle.

4.9. Herpetofauna Surveys

There are many native herpetofauna on Catalina, more so than any of the other Channel Islands. Threats to their populations include disease, worsening drought conditions from climate change, and impacts from the invasive bullfrog. Monitoring efforts would aim to address these threats, track population trends and document the impacts of island restoration efforts on these sensitive species.

There are nine native reptiles [Side-blotched lizard (*Uta stansburiana*), San Diego Alligator lizard (*Elgaria multicarinata webbi*), Coronado skink (*Plestiodon skiltonianus interparietalis*), California kingsnake (*Lampropeltis californiae*), California mountain kingsnake (*Lampropeltis zonata*), Southern Pacific rattlesnake (*Crotalus oreganus helleri*), San Bernardino ring-necked snake (*Diadophis punctatus modestus*), Two-striped garter snake (*Thamnophis hammondii*), San Diego Gopher snake (*Pituophis catenifer annectens*)], two amphibian species native to this Island [Baja California chorus frog (*Pseudacris hypochondriaca*), Garden slender salamander (*Batrachoseps major*)], one invasive reptile [Red-eared slider (*Trachemys scripta elegans*)], and one invasive amphibian species [Bullfrog (*Rana catesbeiana*)].

Very little is known about the two-striped garter snake and the California mountain king snake population on the Island outside of a handful of observations. Other species such as the garden slender salamander, Pacific treefrog, side-splotched lizard and alligator lizard are frequently seen or heard throughout the Island and are assumed to be at relatively healthy population levels, though no formal assessment of this has taken place. Monitoring of all herp species on the Island will provide information about the health of the populations and the impact of restoration on the microhabitats that these cryptic animals rely on.

Herpetofauna surveys will be conducted via systematic coverboard surveys, pitfall traps, funnel traps (single and double ended), dip nets, opportunistic surveys by moving habitat elements (ex. boulders) and hand catching or lasso catching individuals. Pitfall traps may be accompanied by a drift fence and will have mealworms, a PVC tube for shelter and a wet sponge for osmoregulation and will be checked every 12 hours. Funnel traps may be

accompanied by a drift fence and will be checked daily while deployed. Herp funnel traps and pitfall traps will be closed during weather events such as heavy rain. During opportunistic surveys and coverboard surveys, any habitat element that is moved will be placed back exactly where it was found.

Captured herpetofauna will be measured, weighed, sexed and released at their capture site. Captured individuals may also be marked with a temporary non-toxic substance and swabbed (buccal for DNA, exterior for Batrachochytrium dendrobatidis). Biological samples such as toe clippings, scale clippings, and lizard tail tissue may also be collected.

Summaries of annual herpetological efforts will be compiled into an annual report and will be shared with CDFW and maintained on the Catalina Island Conservancy repository.

5. Outreach, Education, Engagement, and Workforce Development

The Project is not undertaken in isolation—it thrives through the active involvement of many communities, each contributing through education, workforce development, recreation, and volunteerism. The Conservancy has intentionally scaled these efforts to match the scope of island restoration, creating opportunities for engagement at every level. By connecting people to the Island's beauty and biodiversity, the Project will foster a shared sense of stewardship while building lasting partnerships that strengthen the restoration process.

5.1. Volunteer Events

The Conservancy hosts weekly volunteer events for both local residents and mainland visitors, providing meaningful opportunities to participate in hands-on conservation. Every Thursday, volunteers gather at the Ackerman Native Plant Nursery, where community members assist with transplanting, seeding, and managing native plants for restoration work across the Island. The Conservancy also runs "Restore and Explore" events, which bring volunteers to various locations for activities ranging from trail maintenance to beach cleanups. As part of island restoration, many of these "Restore and Explore" events will now also focus on wild seed collection and processing and invasive plant treatment.

Volunteer groups form a major component of the Conservancy's restoration workforce. In the first three months of 2025 alone, 13% of invasive plant removals on the Island were completed by volunteer groups staying at one of two dedicated camps—Laura Stein Volunteer Camp or Black Jack Volunteer Camp. During the first half of 2025, the Conservancy hosted 18 different groups, including Toyota, Farmers & Merchants Bank, Armanino CPA Group, the American Hiking Society, Daughters of the American Revolution, Keene State College, and California State University–Long Beach. These groups receive

complimentary camping accommodations and a front-row seat to large-scale conservation in action, gaining a unique and immersive experience in island ecology.

5.2. Workforce Development

The Conservancy's partnership with the conservation corps has grown substantially in recent years. The Conservancy relies on the corps for critical restoration work, including wildlife surveys, nursery enhancements, invasive plant removal, and—soon—seed collection.

In 2025 alone, conservation corps removed 32% of all invasive plants cleared from the Island's landscape, making them an essential part of the Conservancy's restoration success. This partnership has also expanded to include on-Island internships.

5.3. Public Outreach

Continued public outreach is a vital part of the Conservancy's mission. Each month, the Conservancy hosts the Catalina Island Speaker Series, a free event available both in person and virtually, featuring scientists who share their expertise and experiences with the public. The Conservancy also holds Community Conversations—an in-person forum where community members can engage directly with Conservancy leadership and ask questions.

In addition, the Conservancy organizes special events such as a recent community event around wildfire resilience, which included a new fox mascot serving as an Island ambassador and posting fire danger levels at the local museum. This free program gave local schoolchildren the opportunity to suggest a name for the fox mascot, interact with Conservancy scientists, and enjoy a documentary about the Island fox. These events create meaningful opportunities for learning, dialogue, and connection between the community and the conservation work happening on Catalina.

5.4. Education

The Conservancy's education team offers multiple pathways for the public to learn about restoration and conservation on Catalina. This includes the free, online Naturalist 1 course, as well as the more advanced Naturalist 2 and California Naturalist (CalNat) courses. In the first quarter alone, the Conservancy's team educated more than 400 TK–12 students both on- and off-Island through youth and science programs. So far this year, the Conservancy has hosted 41 public programs, engaging over 385 participants. All of these educational offerings will continue, with the Catalina Island Restoration Project featured prominently as part of the Conservancy's broader community engagement efforts.

6. Exhibits

Exhibit 1: 10-acre Restoration Testing Site

Exhibit 2: 105 acre Restoration Location

Exhibit 3: Second Major Location for Restoration

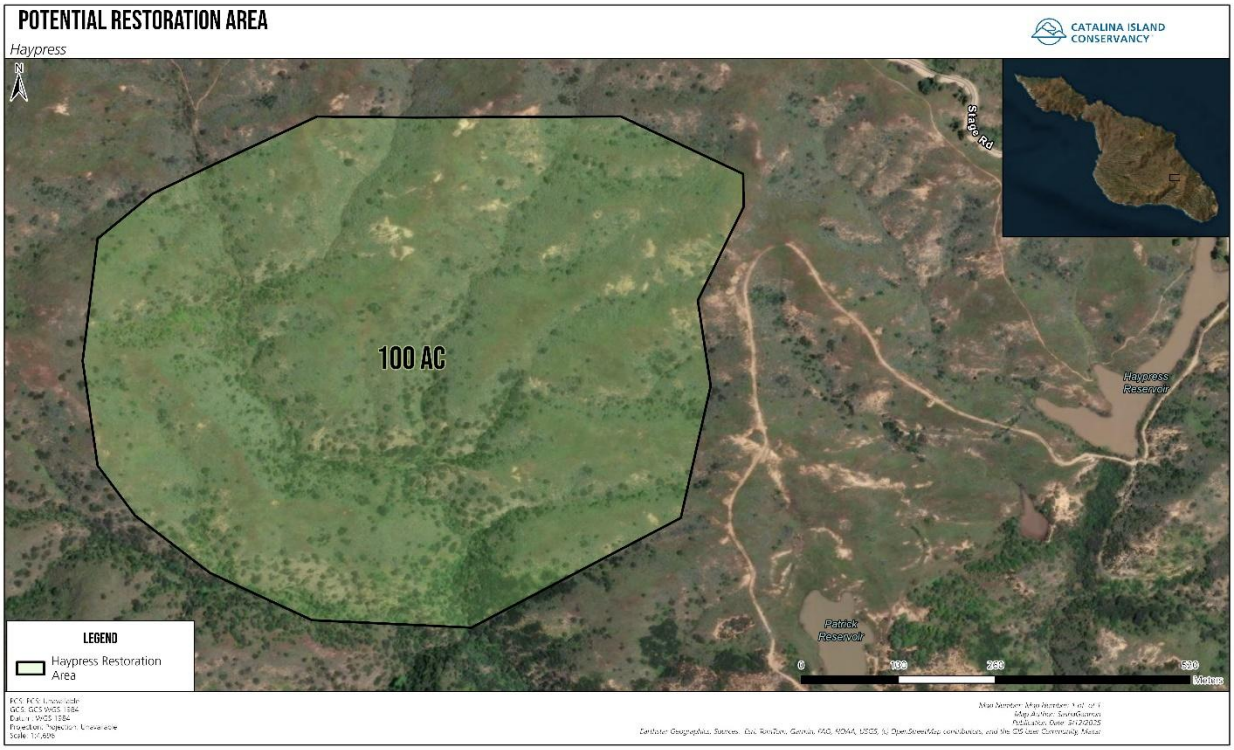

Exhibit 4: 2024 Fox Traplines and Trap Locations

Exhibit 5: 60 Legacy Long-Term Vegetation Monitoring Plots

Exhibit 6: Song Bird Acoustic Monitoring Sites

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