

Catalina Island Climate Resiliency & Restoration Strategy

Catalina Island ecological communities are no longer threatened with extinction and can thrive in the future.



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Authors and citations

This report was constructed with the help of many individuals.

Here at the Catalina Island Conservancy, it includes Lauren Dennhardt, Emily Hamblen, Kevin Alison, Makenzie Henk, Cayman Lanzone, and Rachel Boyce. Outside of the Conservancy, we relied on Travis Brooks of Land IQ.

This draft was prepared by Lauren Dennhardt on December 28th, 2022.

Overview

Project objective/scope: Our overall objectives are to ensure that flora and fauna are no longer threatened with extinction, and to build resiliency into our ecological communities. The critical first steps to allow for these objectives is to manage the non-native mule deer population on the island and implement our landscape level restoration plan.

Project priorities:

- 1) Allow for restoration and recovery efforts to succeed on Catalina Island, so plants no longer need to be caged and we can implement landscape level restoration. Currently, all restoration efforts have to occur inside an enclosure or plants need to be individually caged. Much of the island is type converted into invasive annual grasses. On Catalina we could reverse this with invasive grass management paired with seeding, but while deer are still present, these efforts would be fruitless. This would result in more habitat for native fauna such as the Catalina Island shrew and the Catalina Island fox.
- 2) Ensure that flora and fauna are no longer threatened with extinction or extirpation. Deer target island endemic species, meaning that there are higher densities of deer resistant plants on the landscape. Deer target the plant species unique to Catalina Island, which creates an overrepresentation of common mainland species. Already 32 plant species have been extirpated from the island. This year we prevented the Catalina nightshade from going extinct.
- 3) Prevent further suffering of deer on Catalina Island (they are at 8x the density as they are on mainland). Deer are suffering on the island from starvation and thirst. Hunting does not work as a way of managing populations due to lack of interest and expense. Fawns are found dead frequently in the streets of Avalon. Deer encounters in town with people are common because of their desperation for food resources, which is problematic because it is likely more deer are born from human feeding, exacerbating the problem, along with habituating deer to humans – creating conflict and allowing for spread of zoonotic diseases. Management by hunting results in more animals being killed than complete removal of deer from the island.

Goal with Scientific Collections Permit

Introduction

Our goal is to restore the island to be more climate resilient and biodiverse. The critical event that needs to occur is to manage the deer population. The carrying capacity for deer on Catalina Island is zero since they are non-native species with documented detrimental effects on local flora. To achieve this goal, we need to assess all management options in collaboration with CDFW. Our goal is to choose a methodology that is humane, effective, and financially feasible.

Within this overall strategy, we plan to monitor how deer management impacts the Island's flora and fauna. Additionally, the biggest experimental piece is to begin major landscape-level restoration on Catalina Island.

Methods

Assessment of management strategies

Our plan is to reach out to experts on various management strategies and receive recommendations on the best overall methodology. We will use an Environmental Impact Statement to assess each option and open it up to public review. This method will be thorough and extensively managed to move the project forward.

Pre and post monitoring

The Catalina Island Conservancy has a long history of historical vegetation monitoring. For this project, we will go back to our Land Bird Monitoring Sites to collect data on land birds and vegetation. We have extensive data from surveys in 2001, 2002, and 2007. We will resurvey locations using the belt transect method in 2023-2028 to monitor 1) how has vegetation changed since the goat and pig efforts, and 2) to have a marker for pre and post deer management.

A total of 80 points scattered throughout the island will be resurveyed (Figure 1). They will include a bird survey, vegetation analysis via the belt-transect method, and photomonitoring.



Figure 1. Locations of Land Bird Monitoring on Catalina Island.

Landscape-level restoration strategy

After deer management, there will immediately need to be a plan for management on the island. We have hired Land IQ to help develop our management plan post-deer management. They will begin January 2023 and complete by June 2024. This plan will consider invasive species management, seed

bulking and processing, and strategies to convert invasive grasslands and degraded habitat into biodiverse locations. Details on that plan are outlined in Project one.

Strategy structure

To achieve these priorities, we at the Catalina Island Conservancy have determined there are three large projects that need to occur simultaneously 1) Construction of a landscape level restoration plan, 2) building a seed farm, and 3) management of deer.

These three projects together form our Catalina Island Climate Resiliency & Restoration Strategy (Fig. 2). The vast majority of all three will be completed by 2026. The overall strategy timeline can be found in Table 1.

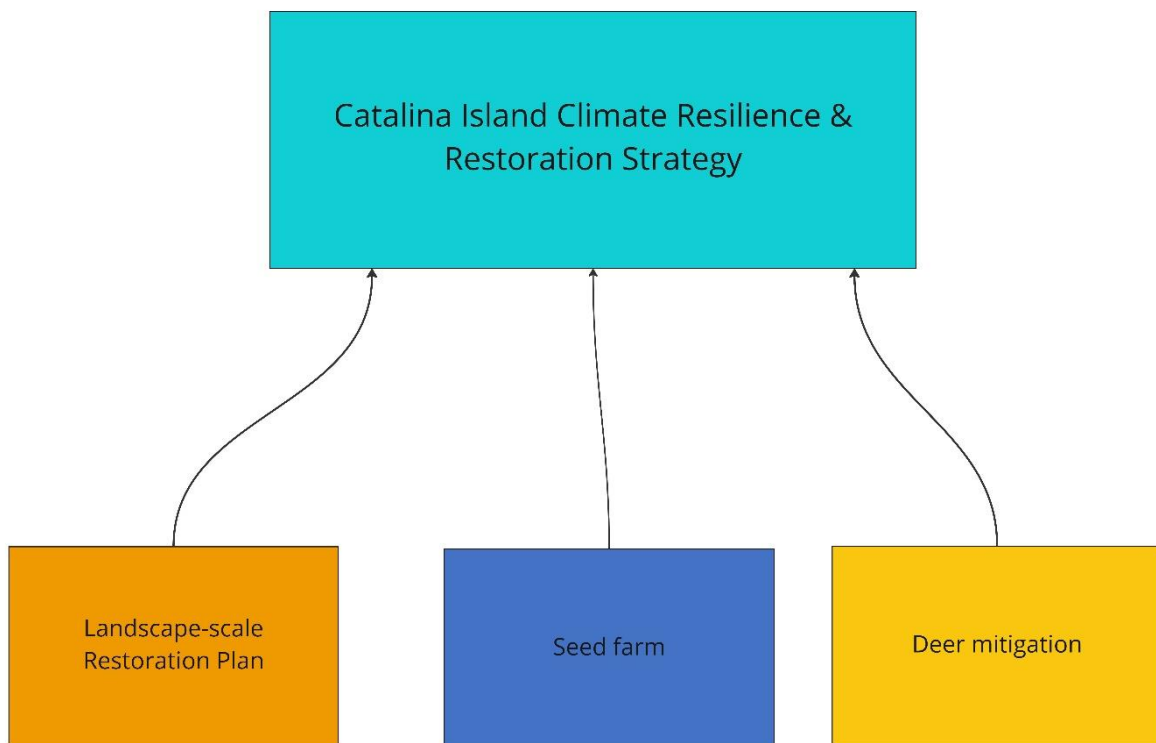


Figure 2. Three projects that constitute the- Catalina Island Climate Resiliency and Restoration Strategy.

			2023	2024	2025
Start	Finish	Deliverable			
Jan-23	Jun-23	Existing Conditions Summary Report	Orange		
Feb-23	Jan-24	Geodata for Restoration work	Orange		
May-23	Mar-24	Landscape-scale Habitat Restoration Modeling Report	Orange		
Apr-23	Jun-24	Landscape-scale Habitat Restoration and Enhancement Plan	Orange		
Jun-24	Dec-24	Landscape Grant Development Support	Orange		
Jan-25	Dec-25	Site Preparation		Blue	
Jan-23	Jun-23	Seed Farm Assessment		Blue	
Jul-23	Dec-23	Permitting, hire contractors, for seed farm		Blue	
Jan-24	Dec-24	Build Seed Farm & collect seeds		Blue	
Jan-25	Dec-25	Grow-out, and seeds processed		Blue	
Jan-23	Apr-23	Restoration Internal Communications Strategy Developed		Yellow	
Apr-23	Jun-23	Restoration External Communications Strategy Developed		Yellow	
Mar-23	Jun-25	Monitoring island		Yellow	
Jul-23	Jun-24	Implementation of Communications Strategies		Yellow	
Feb-23	Jun-24	Restoration CEQA process		Yellow	
Jan-23	Dec-23	Logistic strategy for deer management		Yellow	
Oct-24	Dec-25	Deer management			Yellow

Table 1. Timeline for the three different projects within our Climate Resiliency and Restoration Strategy. The landscape-level restoration plan (orange), seed farm (blue), and deer management (yellow) with rough timelines. NOTE: Deer management will extend out into 2026.

Project 1. Landscape-level Restoration Plan

Author: Travis Brooks, Land IQ

At the request of the Catalina Island Conservancy (CIC), Land IQ has developed this proposal to support planning for landscape-scale habitat restoration and enhancement of Santa Catalina Island. After the end of cattle ranching in the 1950s and the removal of non-native ungulates (wild goats and pigs) in the 2000s, there was an expectation that rangeland would passively recover its pre-disturbance native habitat. While there are areas where native cover and diversity increased, there remain large parts of the Island that remain “stuck” due to the legacy effects of land use (e.g., cattle grazing, nonnative browsing, cultivation of soils, erosion of topsoil), changes to the natural fire frequency (e.g., increased fire frequency, more intense fires due to increased aridity), loss of the native seed bank over time, and the introduction of invasive Mediterranean forbs (e.g., nonnative annual grasses and mustards). Some of these factors remain and will be intensified under projections of climate change (e.g., increased summer maximum intensity, decreased winter precipitation). Not all areas on the Island remain “stuck” in type-converted or degraded habitat types. But, for many of those areas that did recover native vegetation, they are overrepresented by the “weedier” native shrubs that can quickly colonize disturbed soils (e.g., *Baccharis* spp. from large number of wind-blown seed), and are resistant or non-palatable to browsing pressure from nonnative deer that remain on the Island. There are plans to remove the deer from the Island and the habitat restoration planning will assume that the deer population has been significantly reduced soon. Some consider habitat that has naturally revegetated with deer-resistant native species as having been “invaded” and lower quality; we will consider the value of these revegetated areas against the likely historic vegetation communities and the requirements of the endemic, locally rare, and at-risk wildlife and rare plants that are key to the biodiversity of the Island.

In the context of accelerating impacts from changing climate and an ecosystem that has on-going and legacy impacts from nonnative species introductions, increased fire frequency, cattle grazing, road, and dam construction—what are strategies that CIC can use to restore and enhance the native and endemic biodiversity of the Island over large areas?

Land IQ in collaboration with UCLA Professor Travis Longcore, PhD, have developed this scope of work to develop spatial models to direct CIC habitat restoration and enhancement efforts in areas that balance the goal of restoring large areas of the Island with the mission of conserving endemic biodiversity. Next, we will prepare a Landscape-Scale Habitat Restoration and Enhancement Plan (HREP) to guide CIC planning and implementation of cost-effective restoration over large areas (100s to 1000s of acres) leveraging natural-rainfall and seed-based restoration methods. And last, we will collaborate with CIC staff to develop a project proposal for funding consideration to begin implementation of the Landscape-Scale HREP. We will work with the CIC Project Manager, Lauren Dennhardt, to integrate information from two other planning efforts that are currently in development, the nonnative deer management project, and the seed farm bulking project (in collaboration with Irvine Ranch Conservancy).

No.	Tasks and Subtasks	Start	End
1.00	Task 1. Existing Data Review	1/9/23	2/6/23

1.10	Kick-Off Meeting with CIC Staff (Request Datasets & Documents)	Proposed for week of Jan 9	
1.20	CIC Data Transfer to Land IQ		
1.30	Review Spatial Datasets		
1.40	Review Biological Reports		
1.50	Review Records of Past Land Management Activity		
2.00	Task 2. Existing Conditions Summary Report	2/7/23	6/8/23
2.10	Executive Summary		
2.20	Introduction		
2.30	Summarize Existing Available Data (Reviewed in Task 1): Spatial Datasets, Biological Occurrence Data, Ecological Information, Past Land Management Activity		
2.40	Maps: Make Field Maps to Verify in the Field (Task 7)		
2.50	Identify Current Threats to At Risk Biological Resources: Wildlife, Rare Plant, and Vegetation Community		
2.60	Identify Vegetation Communities Impacted (Type-Converted or Degraded) by Past Land Use Practices (livestock grazing, erosion from roads, dams altering hydrology, increased fire frequency and intensity) and Introduction of Nonnative Species (e.g., deer browsing pressure)		
2.70	Maps: Current Threats to Biological Resources x Current (and Historical Occurrences): Fire History, Rare Plant Locations, Vegetation Community Map, Future Change in Climatic Factors Compared to Normals		
2.80	Landscape-Scale Habitat Restoration and Enhancement Project Goals and Objectives		
2.90	Data Gaps and Modeling Needs (e.g., Veg Community Stability, Fire History)		
2.10	Environmental Modeling Datasets Required and Sources of Data (e.g., Past, Normals, Future Projection of Climate; Derive Topography Features from DEM; Wind Direction and Velocity; Salt Spray/Salinity; Cold Air Drainage; Indices; Processing Masks)		
2.11	Species Occurrence Datasets Required and Sources (Keystone Species of Veg Communities; Rare Plants and Wildlife that are Focus of Conservation Efforts)		
2.12	Analytical Methods, Scale of Analysis (e.g., Raster cell size), Modeling Tools/Programs		
2.13	Deliverable: Draft Existing Conditions Summary Report to CIC for Review		5/4/23

2.14	CIC Staff Feedback and Review	5/5/23	5/25/23
2.15	Finalize Existing Conditions Summary Report		
2.16	<i>Deliverable: Final Existing Conditions Summary Report</i>		6/8/23
3.00	Task 3. Modeling	2/7/23	1/29/24
3.10	Geodata Management and Pre-Processing		
3.20	Manual Digitization of Historical Maps		
3.30	Create Environmental and Species Occurrence Modeling Layers		
3.40	Vegetation Community (and At-Risk Wildlife Habitat?) Suitability Models		
3.50	Review Model Outputs with TL, TB, and Revise HSMs		
3.60	Potential Vegetation Community Map (Weighted Overlay Model: individual veg community x pioneer influence)		
3.70	Weed/Native Habitat Stability Analysis (Kevin Allison re-survey of early 2000s transect and releve sites in Spring 2023)		
3.80	Livestock Grazing Impact Modeling (Legacy Effects from Past Livestock; Different from Broader Impact of Nonnative Deer Browsing); Also Consider Modeling Impact from Road and Dam Construction on Erosion and Hydrology		
3.90	Prioritization Model and Mapping (e.g., Decision Tree Based on Level of Effort Needed to Restore)		
3.10	Preparation of Geodata for Delivery to CIC		
3.11	<i>Deliverable: Geodata Delivery to CIC</i>		1/29/24
4.00	Task 4. Habitat Restoration and Enhancement Opportunities Modeling Report	5/16/23	3/4/24
4.10	Introduction and Methods Sections		
4.20	Maps: Existing Environmental Conditions and Occurrence Data for Key Taxa Groups, and Species of Conservation Focus		
4.30	Maps: Veg Community Suitability Maps and Weighted Composite Veg Suitability Map		
4.40	Maps: Stability Analysis Maps		
4.50	Maps: Livestock Grazing Impact Map		
4.60	Habitat Restoration and Enhancement Priorities		
4.70	State-Transition Models for Key Vegetation Communities Targeted for Habitat Restoration (i.e., identify key mechanisms for restoring native habitat)		
4.80	Priority Maps: Areas Likely to Passively Recover with Removal of Nonnative Browsers		
4.90	Priority Maps: Areas that Require Active Intervention to Restore or Enhance Native Habitat		

4.10	Priority Maps: Existing Habitat for Key Species Opportunities to Restore, Enhance or Create (if Necessary)		
4.11	Results and Discussion Sections		
4.12	Deliverable: Draft Modeling Report to CIC for Review		1/29/24
4.13	CIC Staff Feedback and Review	1/30/24	2/19/24
4.14	Finalize Report		
4.15	Deliverable: Final Modeling Report		3/4/24
5.00	Task 5. Landscape-Scale Habitat Restoration and Enhancement Plan (HREP)	4/11/23	6/27/24
5.10	Executive Summary		
5.20	Introduction		
5.30	Goals and Objectives		
5.40	Conceptual Approach		
5.50	Opportunities and Constraints		
5.60	Priorities		
5.70	Weed Management		
5.80	Native Plant Material Addition		
5.90	On-Going Management (including High-Priority Invasive Plant Control)		
5.10	Implementation Challenges and Needs for Future Research		
5.11	Deliverable: Draft HREP to CIC for Review		6/3/24
5.12	CIC Staff Feedback and Review	6/4/24	6/24/24
5.13	Finalize Report		
5.14	Deliverable: Final HREP		6/27/24
6.00	Task 6. HREP Implementation Grant Development Support	6/28/24	12/26/24
6.10	Professional Services to Support CIC Develop Project Material for Grant Support to Begin Implementation of the HREP		
7.00	Task 7. Catalina Island Field Work	2/21/23	5/17/24
7.10	Field Vegetation Map and Modeling Assessment #1 (Feb 2023; NN) (4 days)	Week of Feb 27 or March 6	
7.20	Interview Staff Regarding Existing Habitat Restoration Operations and Facilities (Feb 2023; TB) (4 days)	Week of Feb 27 or March 6	
7.30	Botanical Collective Rare Plant Meeting (March) (3 days)	3/17/22	3/19/22
7.40	Field Vegetation Map and Modeling Assessment #2 (April 2023) (4 days)	4/17/23	4/20/23
7.50	Field Investigation and Staff Interviews (May 2023)	5/15/23	5/18/23

7.60	HREP Plan Development Staff Visit and Discussions (May 2024)	5/15/24	5/17/24
8.00	Task 8. Direct Expenses	1/9/23	12/26/24

Table 2. Key strategy and objectives developed by Land IQ.

Project 2. Seed farm facility

Authors: Rachel Boyce, Plant Lead Tech; Cayman Lanzone, Conservation Horticulturist; Kevin Alison, Rare Plant Ecologist; Lauren Dennhardt, Ph.D. Director of Conservation

Mission

Produce a reliable source of locally adapted seed for landscape-scale restoration.



Introduction

Our team consulted with Matthew Garrambone and Sunny Saroa from the Irvine Ranch Conservancy to determine a plan for a Native Seed Farm on Catalina Island. This native seed farm will provide plant material to facilitate climate resilience, mitigation, biodiversity, and landscape-scale restoration. As a restoration seed bulking facility (RSBF), the farm is a critical tool to achieve large-scale ecological restoration goals, particularly where the wild harvest is unsustainable. The farm will help protect key biodiversity assets from harvest pressures and provide novel opportunities for research, public exposure, volunteer opportunities, and community building focused on Catalina's native flora. Large-scale ecological restoration projects demand plant reintroduction and copious quantities of native plant seeds to adequately meet restoration goals. Our current restoration activities make use of seeds harvested from wild populations sourced on Catalina. However, are limited by current field collection and production capacity. This plan aims to minimize pressures on wild populations while ensuring the genetic diversity representative of natural populations is maintained. Considering our circumstances as an island with understudied flora and fauna species morphologically and genetically unique compared to mainland taxa, we want to continue using local provenance seeds and maintain our current gene pools. Outsourcing the production of genetically diverse, Catalina-derived seeds would be an expensive endeavor. Therefore, establishing the capacity to do so on the island would be a valuable investment while maintaining biosecurity control. Our recent visit to the Irvine Ranch Conservancy provided insight into why we should move towards seed bulking and production on the island. Other seed production facilities rarely have large quantities of seed on hand and do not focus their efforts on rare plants. Specialty bulking is on contract and costs \$16,000/acre/year at a minimum. Bulking seeds in-house would allow more control over genetic sources, diversity, and selection.

Wild harvesting alone combined with the nursery's current output will not meet our landscape-scale restoration needs. Many of our rare and vulnerable species have dwindling numbers (i.e., Catalina Grass, Lyon's Pygmydaisy) and we cannot risk overharvesting from source populations. These plants have proven difficult to access and survey, having been pushed to the outskirts of the island where browsers cannot reach them. In addition, the number of seeds wild plants produce year to year is highly variable. Therefore, the seed farm would allow us to increase rare plant populations by seed with minimal impact to current wild populations. Currently, our nursery focuses on perennial woody plants and forbs propagation. However, the seed farm would allow us to expand conservation efforts to include perennial grasses and annuals, which are especially challenging to gather seed from in the wild. We anticipate growing pains during our transition to island-wide restoration efforts. Future demand would exceed the volume of native seeds that we can, economically, and ethically produce. A seed bulking facility could alleviate native plant accessibility issues, provide an efficient space to grow large numbers of rare annuals, and provide a reliable source of seeds. A seed bulking facility would also increase production output by approximately 50% compared to wild collections.

Most actions for this project will be completed in four years with ongoing maintenance extended beyond that timeline. The project will require both internal and external support to complete. This is a living document, as we move forward with this project some of the specifics of the plan may be altered to adapt to stochastic factors (unavailable supplies, labor shortages, new knowledge, etc.). The point of this document is to prepare all members of the Conservation staff for our goals moving forward.

Goals and Deliverables

1. *Create an infrastructure plan.*

- Create a blueprint/site map for facilities
- Create a timeline for development
- Permitting
- Equipment list
- Approval by the organization
- Budget
- Irrigation plan
- Identify existing infrastructure

2. *Seek and collect seeds.*

- Develop a list of species and target amounts needed for the farm (from landscape level restoration plan)
- Develop and update BMPs and standards for seed collection and processing
- Map populations and areas to collect from
- Integrate with the Volunteer program

3. *Build Facilities*

- Get quotes and select contractors
- Prepare sites
- Build and update infrastructure

4. *Establish and maintain bulking fields.*

- Install an irrigation system
- Weed management/site prep
- Layout for target species
- Determine seeding treatment and rates
- Seeding
- Planting
- Weed maintenance
- Determine the best harvest method

5. *Establish and maintain an inventory system.*

- Determine the best methodology for tracking seeds
- Seed testing protocol and system for both rare and common species
- Refining field to end product tracking

6. *Integrate the facility with our restoration plan.*

- Choose seeds and integrate systems

Infrastructure Plan and Options

Dog Park

The dog park site would be an ideal location for a bulking field because there is already fencing in place, it would just need some weed management to set it in motion. It is open and sunny, which is ideal for seed drying. It is surrounded by open space, so it would be easily expandable. We could also build a pole barn here for seed processing and storage. Its primary use would be for growing common annual and perennial plants. It would allow for large-volume and large-scale production.



Old Nursery

The old nursery site has a solid foundation of existing infrastructure and is compact in each zone. However, it is home to a few large, rare trees that cannot be removed, so it is a very shaded area. It already has a Conex box that should be reutilized for storing supplies and equipment. This site could be used for processing and drying seeds. It could also be used for starter beds to grow first-generation common plants and second-generation rare plants.





Ackerman Native Plant Nursery

The grow-out area of the Ackerman Native Plant Nursery could be utilized for seed production. It already has irrigation installed and all the infrastructure necessary. We could install raised beds and use this area to grow rare plants. The level of control this site would provide would allow us to easily track the genetics of rare plants.





Volunteer and Staff

Project Management

Management of this project will include planning, species selection, budgeting, inventory analysis, selecting and hiring contractors, prioritization, and data management.

Maintenance and Processing

Maintenance will be the most expensive part of this project. We can hire contractors and use our staff for weed maintenance and irrigation maintenance. Staff and volunteers will handle seed processing.

Seed Production

Seed production will generally include seeding, planting, weed maintenance, irrigation maintenance, harvesting, processing, inventory, weighing, bagging, and dormancy breaking if necessary. Storage and harvest management will be very important. We will also need labor supervision and a field crew.



Project 3. Deer Management

Author: Lauren Dennhardt, PhD

Project structure narrative:

This is a highly complex project – it is a multi-million-dollar project, involves the entire organization, outside stakeholders, and the requirements of the project are undefined. It will change and alter as we learn new information and legal pathways forward. It will rely on technology in some cases that have been proven (helicopter, infrared cameras) and other times unproven (large-scale sterilization). Deer are charismatic and ensuring the public and politicians understand the complexity of the issue and what is at stake is important. We have already learned that deer hunting is an expensive and unsustainable model with reduced interest every year. Our challenge will be to ensure we build the public relations and legal capacity within and outside our organization to handle and adapt to the project. Currently, we have almost found a framework to move forward within current game management and CA legality.

Components of Work Breakdown Structure in project:

A work breakdown structure outlines the key components of the deer management project along with key deliverables.

- Develop/implement a public relations strategy
 - Hire a public relations firm
 - Train staff on public relations
 - Develop a plan for outreach to different stakeholders
 - Reach out to key stakeholders and influencers
- Complete CEQA process
 - Organize and deliver scientific literature on project
 - Talk to experts and hire some to deliver management plans
 - Work closely with CDFW's lawyer to organize and deliver information to the state
 - Develop all possible management outcomes and use structured decision making to choose the best options
 - Wait for public comment period
- Complete logistics plan and implement it
 - Housing for personnel
 - Compensation and funding
 - Helicopter logistics
- Monitor changes to floral and faunal communities
 - Establish long-term vegetation and wildlife monitoring plots
 - Complete monitoring before and after management
- Create a landscape-level restoration plan
 - Hire contractors to develop the plan
 - Have it completed before deer management is executed to apply for a \$5 million Wildlife Conservation Board grant, funding conservation department in the future
- Implement management plan
 - Pick a contractor and complete the chosen plan

Project management

The best management strategy for this highly complex project is to use the Agile Scrum Methodology. This methodology promotes collaboration and agile thinking by developing multiple small teams with a specific goal. Each team consists of 3-5 members that can easily be organized and adapt as the project evolves. It requires a strong leader to communicate between teams and keep the project on track for successful completion.

Teams

- Teams for deer project (NOTE: Lauren Dennhardt will facilitate and communicate all information between groups).
 - Political Team –
 - Goal: Navigate politics outside of Conservancy, identify risks before they emerge, ensure everything is OK in Sacramento.
 - Team: Kim Delfino (Lobbyist, Founder of Earth Advocacy), Brendan Cummings (Director of Conservation, Center for Biological Diversity), Hallie Kutak (Staff Attorney, Center for Biological Diversity), & Debbie Sivas (Director of Environmental & Natural Resources Law and Policy Program).
 - Public Relations & Communication Team –
 - Goal: Keep consistent communication inside the organization, provide strategy for City of Avalon, provide strategy for inside Conservancy, identify key stakeholders to engage → move neutrals to positives; negatives to neutrals; develop & implement external communications strategy
 - Team: Hillary Holt (Community Learning Manager), Gina Nelson (Senior Manager, Membership & Growth Marketing), ~~Kim Delfino (Lobbyist, Founder of Earth Advocacy)~~, Chris Young, Jes Boudevin, and Kim Sudhalter & Howard (La Brea Public Relations Firm).
 - Logistics Team –
 - Goal: Determine best management strategy, identify alternative management strategies, solve logistics – locations for helicopter, communication, housing, fueling, and overcoming hurdles.
 - Team: John Knapp (Senior Island Scientist, The Nature Conservancy), Chris Young (Senior Operations Manager, Conservancy), Tim Kielinski (Chief Operating Officer), and White Buffalo Team.
 - Legal Team –
 - Goal: Prepare for potential lawsuits and mitigate ones as they inevitably appear
 - Team: Need to have a lawyer on retainer – identify a good option in conjunction with Jill Corral (CFO), Tony Michaels (Benefactor member), and Victoria Seaver (Board member).
 - Restoration Team –
 - Goal: Prepare a plan for post-deer Catalina, how to move “stuck” ecosystems. Plan for post-deer management future.
 - Team: Emily Hamblen (Senior Wildlife Biologist), plant conservation manager, Travis Brooks (Land IQ), Travis Longcore (Adjunct professor, UCLA Institute of the Environment and Sustainability), Daniel Wehner (GIS program manager).
 - Science Team –

- Goal: Prepare documents to support CEQA process and provide feedback on key aspects of logistics.
- Team: Emily Hamblen (Senior Wildlife Biologist), Kevin Alison (Rare Plant Ecologist), plant conservation manager, and Makenzie Henk (Wildlife Biologist)

First 90 Days

January

- Form & solidify teams for deer project
- Collect support letters for deer project
- Go to Sacramento to meet Valerie Termini with Tony Michaels & Kim Delfino – our main contact at CDFW for the duration of project; ensure that CDFW is comfortable moving forward – present deer plan
- Complete stakeholder map and begin building out a communications strategy, including a guide on discussing project for CIC staff
- Complete plans for Islands of California Botanical Collaborative meeting on Catalina, will use as leverage for comms strategy
- Have rare plant ecologist determine locations for pre-vegetation surveys in conjunction with wildlife team to capture fauna.

February

- Bring Kim Delfino to island to train Conservation, Development, and Education teams on handling difficult questions on deer
- Have one-on-one conversations with CIC staff on deer project and why it's important.
- Develop plan for community outreach – develop map of key people to reach out to about deer and determine who has those conversations.
- Begin biweekly meetings with senior wildlife biologist, plant conservation manager, GIS manager, and director of conservation operations. Keep open communication with team, determine path forward on Environmental Impact Review. NOTE: this will take a lot of team effort
- Conservation team begins monitoring locations for pre-deer management.

March

- Begin conversations with people of Avalon individually – only those who are key community members
- Begin mapping out logistics of deer management plan – helicopter, personnel, fundraising, etc. Put it all on people's radar.
- Hire lawyer on retainer for the Conservancy with help of senior leadership
- Develop external communications plan with deer communications team.
- Host the ICBC meeting, use it as leverage for communicating the deer issue.

Risk Management & Mitigation

Mitigating risk will be critical for project completion. Although we are unable to foresee all risk, there are some important aspects below that we will need to address before they occur. I have used a failure mode and effects analysis to outline some of the likely risks we will encounter in this project and given them both an unmitigated and mitigated score (Table 1). These will further be developed and refined by our teams.

	Event / Risk	Unmitigated Likelihood	Unmitigated Impact	Unmitigated Risk Score	Mitigating Action Plan	Mitigated Likelihood	Mitigated Impact	Mitigated Risk Score
		1 (very low) to 10 (very high)	1 (very low) to 10 (very high)			1 (very low) to 10 (very high)	1 (very low) to 10 (very high)	
1	Sabotage within organization	5	5	25	Communicate with staff members early in process	2	2	4
2	Divisive portrayal of project in media	10	7	70	Get ahead of bad portrayal through a PR strategy	10	1	10
3	Protests in town	5	2	10	Communication with community members	3	1	3
4	Staff turnover	7	3	28	Build redundancy into process	7	1	7
5	Lawsuits	10	10	100	Complete CEQA process	10	5	50
6	Sabotage on island during management	6	2	12	Put operations in inaccessible part of island	1	2	2
7	Threats to staff	8	5	40	Communicate with staff and community members, prepare action plan	7	4	28

Table 1. Unmitigated and mitigated risks associated with deer management project along with scores.

Risk Response Development (RRD) and Response Control (RC)

Initial risk response development and risk response control will be further developed by a team in mid-late 2023.

- Sabotage within organization

- RRD: Address sabotage directly with staff members and human resources. Start a dialogue with their concerns and address it directly.
- RC: Try to contain sabotage and address underlying issue.
- Divisive portrayal of project in media
 - RRD: Go to various media sources, ask them to come to island to learn more and see ecological damage of deer.
 - RC: See if there is a waterfall effect from first story and go to other media outlets to contain story.
- Protests in town
 - RRD: No initial action, do not engage protestors in the moment.
 - RC: Note key people in protest and engage with them one-on-one to see if there is room for discussion.
- Staff turnover
 - RRD: In the short term, handle staff turnover with redundancy built into the system.
 - RC: Quickly replace that person.
- Lawsuits
 - RRD: Use CEQA document to quickly move lawsuits through courts. Have lobbyist make phone calls to move process forward.
 - RC: Discuss with lawyers what potential lawsuits may occur and develop a more informed action plan.
- Sabotage on island during management
 - RRD: Quickly fix or replace whatever was broken or damaged.
 - RC: Find a way to prevent damage in the future through better security or other risk management.
- Threats to staff members
 - RRD: Tell local authorities, bring staff member to HR, and ensure staff member feels safe.
 - RC: Work with community members to reduce threats to staff members, figure out how to make staff member feel safe with mitigation measures.

Conclusion

This project will be the most important conservation action taken by the Conservancy in decades and will require endurance, steadfastness, and strong project management skills. Once this project is complete it will allow for recovery of rare and endemic plant species, revegetation of the landscape, and ecosystems that can support our unique fauna. It is the greatest opportunity we have as an organization to make our mark at preserving biodiversity and relaunching Catalina as a model for landscape-level restoration on islands.

Our strategy is ambitious because Catalina is a unique resource that needs to be properly managed. Catalina is home to over 60 endemic species and largely represents what California looked like pre-European influence with the ability to be accessed from the most populous County in the United States. Our conservation strategy is to push “stuck” ecosystems into a more resilient and biodiverse state. With the efforts of many key stakeholders this can be achieved and used as a model for island restoration globally.