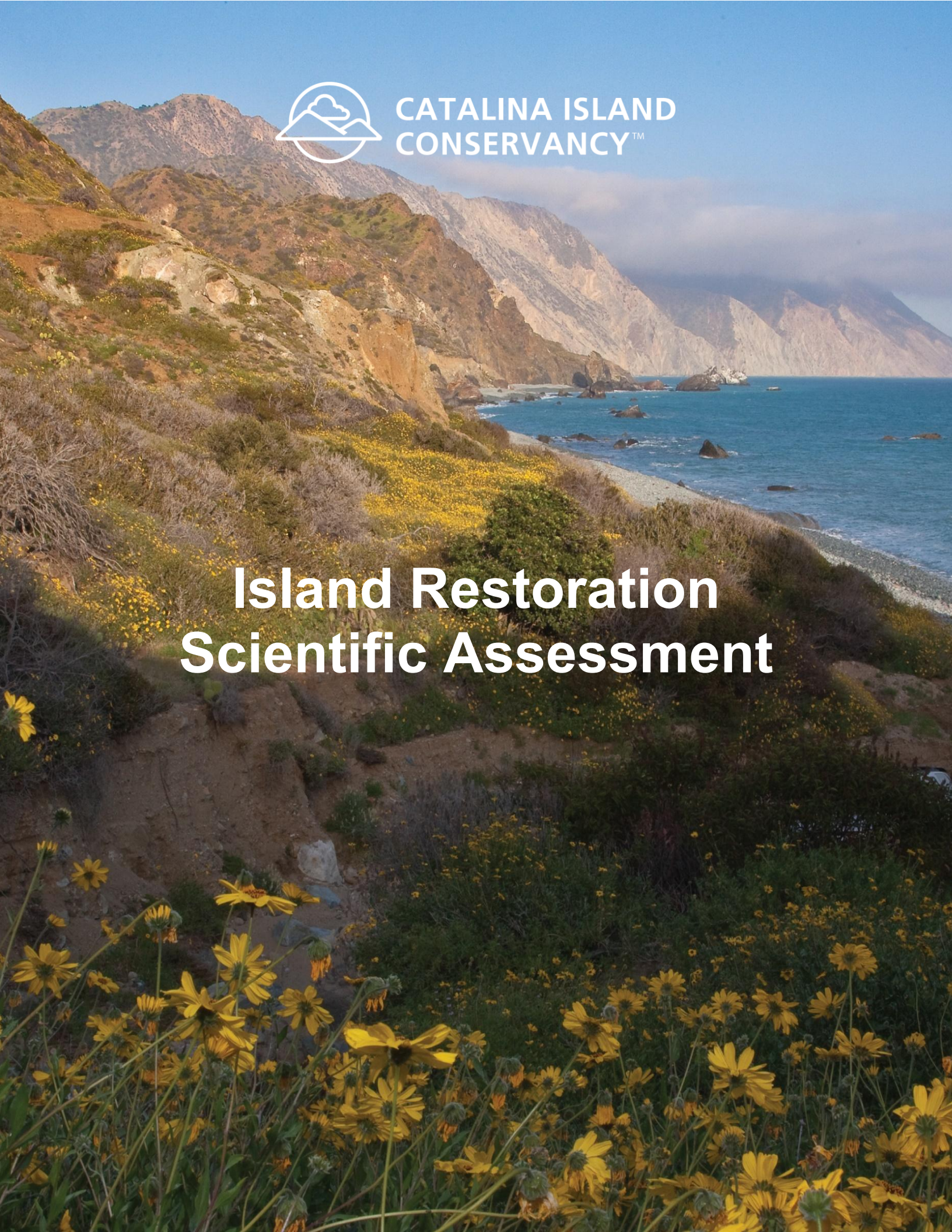

Island Restoration Scientific Assessment

CATALINA ISLAND CONSERVANCY™

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1. Abstract

The Island Restoration Scientific Assessment (IRSA) was developed by seven leading experts in restoration ecology, southern California conservation, wildlife management, and island ecosystems. It reflects the best available science, drawing on decades of research and practice from specialists across the globe. This scientific rigor is further reinforced by the letters of support from respected professionals and organizations included in this document.

The IRSA outlines the ecological benefits of comprehensive Island Restoration on Catalina Island, drawing clear connections to results from comparable restoration efforts worldwide as well as experimental and long-term studies conducted on Catalina itself.

Importantly, the assessment demonstrates that the removal of invasive mule deer using trained on-the-ground specialists is a necessary and scientifically supported step. This approach is fully aligned with established best practices for island restoration—both globally and within California—ensuring that Catalina's restoration is grounded in proven, effective, and responsible methods.

2. Catalina Island Restoration Project

The Catalina Island Restoration Project (Project) aims to restore ecological integrity on Santa Catalina Island, 88% (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 ecological threats posed by invasive plant species, human-caused fire ignition, nonnative mule deer, 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 is committed to continuing it through 2035.

The first 10 years of the Project aim to refine broad invasive plant treatments followed by seeding native plant species within an enclosed 10-acre site. That site will then be expanded to 105 acres, before moving forward on a second major restoration location.

Critically, to reduce negative impacts caused by the high dispersal rate of invasive species, active restoration will be paired with extensive biosecurity measures, such as invasive plant treatments and fox 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: 1) Island-wide and 2) active restoration. Finally, invasive mule deer will be lethally removed from the landscape to allow for Island-wide natural restoration in which the landscape begins to heal itself, and active habitat restoration work by conservationists. Together all aspects of the Project will ensure a safer and more biodiverse Catalina Island – ultimately removing cages from rare plants and fencing from the landscape.

As climate change intensifies, Catalina is at risk of losing more habitat, state and federally listed plant species, and rare and endemic species (species found nowhere else on Earth) through more frequent fires and the depletion of the soil seed bank (the reserve of seeds stored in the soil). The lack of native woody vegetation and the spread of invasive annual grasslands has increased soil erosion, reduced water

capture into the landscape, and degraded the quality of wildlife habitat. Much of what was once island chaparral and coastal sage scrub is transitioning into invasive annual grasslands, which increases the risk of more frequent and faster-moving fires. The growing likelihood of wildfire ignition across Catalina's landscape puts the entire island, including the City of Avalon (Avalon) at risk.

These challenges have likewise caused diminished climate resilience, a loss in native plant and wildlife biodiversity, the extirpation of native species on Catalina, and the extinction of others from the planet. For example, the endemic Trask's monkeyflower (*Diplacus traskiae*), Pacific dogwood (*Cornus nutallii*), and *Lycium hassei*.

The challenges on Catalina are exacerbated by the invasive mule deer population. Mule deer were introduced to the Island in the late 1920s and early 1930s from ten individuals in total. Their continued presence and browsing behavior harm native plant populations (especially endemic species) and wildlife habitats, support the transition from chapparal to invasive annual grasses, and degrade the ecosystems functions that all Island residents rely on for water capture and recreational value. The nonnative mule deer are suppressing the natural restoration of the ecosystem that would otherwise be expected to occur following the removal of feral sheep, cattle, feral goats, turkeys, and feral pigs and are also preventing active restoration efforts on Catalina at the island wide scale. The challenges facing Catalina cannot be solved in a long-term, sustainable way as long as nonnative mule deer continue to prevent the recovery and restoration of the Island's natural habitat. Recovery has occurred on the other Channel Islands resulting in two formerly threatened and endangered endemic plants, Santa Cruz Island Dudleya (*Dudleya nesiotica*) and island bedstraw (*Galium buxifolium*), along with the Santa Cruz Island fox (*Urocyon littoralis santacruzae*) being delisted (National Park Service, 2024; The Nature Conservancy, 2018)

For decades, the Catalina Island Conservancy and its supporters have worked to remove feral animals that have degraded and overwhelmed the Island's ecosystems. As part of these efforts, the Conservancy spent 42 years attempting to manage the deer population through recreational hunting under the Private Lands Management Program. Even with the longest hunting season in California and years of prioritizing the removal of does before bucks, the program made little progress in reducing the herd. The Conservancy's long-term experience, and decades of hunting data, show invasive mule deer on Catalina Island cannot be effectively managed through recreational hunting.

The damage caused by deer and other introduced ungulates on Catalina is too severe to fix through deer removal alone. The Project addresses these issues by removing the nonnative mule deer, enacting landscape-scale habitat restoration to reverse vegetation type conversion, and continuing long-term monitoring of plant and wildlife populations. Successful implementation of the Project, and its realized benefits, depends on the proposal to completely remove mule deer from the Island, primarily through ground-based shooting by trained specialists, as discussed further below.

1.1 Restoration Project Benefits

The restoration of Catalina is critical for the future of the Island's ecology, especially considering the effects of climate change and increasingly uncertain weather patterns. For the ecosystem to be as resilient as possible, it is important to ensure that all of Catalina's biodiversity is represented on the genetic, species, and landscape scale (Oliver, et al., 2015). Without restoration, Catalina is at risk of having

its natural systems altered or degraded. These systems, including water capture, soil retention, and fire resilience, are vital not only for Catalina's native plants and wildlife, but also for the people who live on and visit the Island (Carpenter, Bennet, & Peterson, 2006).

1.1.1 Climate Resilience

The Project supports Catalina's long-term climate resilience through several strategies. By supporting revegetation across Catalina through deer removal, invasive plant reduction, extensive reseeding, replenishing the native seed bank, and targeted plantings, the Project will bolster carbon sequestration. Restoring perennial plants will increase the level of carbon dioxide absorbed by vegetation and stored in the soil, helping to reduce atmospheric carbon levels to mitigate climate change.

The Project will also help improve soil stability and water capture on Catalina. Increased vegetation cover across the Island, particularly perennial plants and their more extensive root systems than invasive annual grasses, will help prevent soil erosion, landslides, and other forms of land degradation, ensuring the land's long-term health and productivity. By increasing soil stability and vegetation cover, the Project will strengthen Catalina's ability to capture fog and rain and retain water. Without this stability, much of that water runs off the landscape, contributing to erosion, or evaporates before plants can use it. This improved water capture will support the health of plant and animal species on the Island and increase the ecosystem's resilience in the face of potential droughts and rising temperatures due to climate change (Woolsey, Hanna, McEachern, Anderson, & Hartman, 2018) (Rastogi & et al., 2016).

The Project's climate resilience benefits also include the protection of vital mesic habitats on Catalina. Mesic habitats are characterized by a balanced moisture supply throughout the growing season compared to other areas that may receive moisture for only a short period of time. These habitats are critical for numerous wildlife species native to the Southern California region as they provide more moderate, dependable conditions for plants and animals. These habitats are found within Catalina's canyons and drainages which offer protection from solar radiation and collect moisture, creating conditions that support species such as the endemic Santa Catalina lancetooth snail (*Haplotrema catalinense*), Santa Catalina shrew (*Sorex ornatus willetti*), and Santa Catalina Island fox (*Urocyon littoralis catalinae*). With changing climate conditions leading to potential range contractions for many species, the protection and preservation of these mesic habitats will provide essential refugia (safe habitat areas full of biodiversity) for organisms, ensuring their continued survival. These mesic communities not only provide a vital resource to local island species, but they provide the needed resources for migratory birds along the Pacific Flyway (Morgan, Maxwell, Tsao, Wildinson, & Etnoyer, 2005).

Lastly, the Project will address the invasive annual grasslands that have replaced native plant communities on Catalina. These are areas where a suite of invasive grasses have outcompeted native species, leading to higher ignitability and reduced biodiversity. As conditions on Catalina become hotter and drier and as annual grasses continue to replace evergreen native perennials, it is crucial to improve the resilience of these landscapes to wildfires. Restoring these areas with native vegetation will create a more fire-resilient and less ignitable landscape, which will help reduce the risk of large, fast-moving wildfires. This restoration will occur through natural recovery, where perennial plants emerge from the soil seed bank, and through active restoration by seeding and planting a diversity of evergreen shrubs to replace the near year-round flashy fuels created by invasive grasses.

1.1.2 Biodiversity

The Project offers significant long-term net benefits to biodiversity on Catalina and the endemic species shared between Catalina and other Channel Islands. The initial focus of the Project is the mitigation of the negative impact caused by the nonnative deer population on the Island. By removing this pressure, the Project will allow vegetation to recover, especially the rare and endemic plant species that are now scarce on Catalina because deer prefer to eat them.

The Project's biodiversity enhancement strategy also includes addressing invasive plant species. These invasive species outcompete native plants for resources, which can lead to a reduction in biodiversity in the immediate invaded area and loss of habitat diversity across the Island. Through focused efforts to control and reduce the proliferation of invasive species, followed by seeding and planting with native species, the Project will help restore more biodiverse plant communities.

These actions not only enhance and preserve the unique flora found only on Catalina but also contribute to more biodiverse wildlife populations. The Project will achieve this by creating and expanding diverse plant communities that that provide refuge, forage, and breeding habitat for wildlife. By creating a more diverse and robust network of habitats, the Project will support a wider range of species, thereby promoting overall biodiversity on the Island.

For example, the Catalina Hutton's vireo (*Vireo huttoni unitti*) depends on the island scrub oak (*Quercus pacifica*) for habitat. The scrub oak's propagules (acorns) do not survive to maturity in large part due to browsing from deer. Improvements in wildlife biodiversity, in particular invertebrates and birds, have also been noted on other islands following the removal of introduced ungulates.

1.1.3 Sensitive Species Recovery

The Project will provide substantial long-term net benefits to the recovery of sensitive species on Catalina. The Project is expected to expand breeding, foraging, and refuge habitat for wildlife species such as the federally and state threatened Santa Catalina Island fox *(Urocyon littoralis catalinae*), Catalina Hutton's vireo (*Vireo huttoni unitti*), Island loggerhead shrike (*Lanius ludovicianus anthonyi*), two-striped gartersnake (*Thamnophis hammondii*), Catalina California quail (*Callipepla californica catalinensis*), and Santa Catalina shrew (*Sorex ornatus willetti*). Each of these species are designated as a Species of Greatest Conservation Need per the 2015 and 2025 California Department of Fish and Wildlife State Wildlife Action Plan. In particular, the Catalina Hutton's vireo is expected to benefit due to its use of oak woodland habitat, which has been degraded by a diminished seed bank and continued presence of introduced deer, which leads to a lack of new oaks sprouting on the landscape. Without action the oaks will not be replaced on Catalina.

The Project will aid in the recovery of sensitive plant species, including island mountain lilac (*Ceanothus arboreus*), the Federally and State endangered Santa Catalina Island mountain-mahogany (*Cercocarpus traskiae*) with only six known wild species left, the Federally threatened island rush-rose (*Crocanthemum greenei*), Catalina grass *(Poa thomasii*), southern island mallow (*Lavatera assurgentiflora* ssp*. glabra*), Catalina ironwood *(Lyonothamnus floribundus* ssp*. floribundus*), Santa Catalina Island bush-mallow (*Malacothamnus fasciculatus*

var. *catalinensis*), the federally and state endangered Lyon's pygmydaisy (*Pentacheta lyonii*), the federally endangered Santa Cruz Island rockcress (*Sibara filifolia*), and Catalina nightshade (*Solanum wallacei*), many of which are recognized by the California Native Plant Society with Rare Plant Ratings, and are identified as Species of Greatest Conservation Need. Catalina's endemic plant species, including those shared with other Channel Islands, are expected to recover the most once deer are removed.These endemic plant species, having evolved without large herbivores, have lost their physical and chemical defenses to herbivore eating habits.

1.1.4 Public Benefit

The Project will result in many incidental public benefits to Catalina and Avalon, including increased recreational opportunities, more secure freshwater resources, and increased safety from wildfires through the improvement of ecosystem services on the Island. The enhancement and expansion of native habitats will promote safe recreation on the Island such as hiking, biking, and plant and wildlife viewing. Additionally, the removal of fences and cages, currently necessary to protect sensitive species from browsing by nonnative mule deer, will increase the visual and aesthetic appeal of the Island. With no recreational hunting occurring on the landscape, visitors will no longer face the close-call safety incidents that are reported each year during the hunting season, creating a safer experience for everyone.

The Project will help secure freshwater resources for Catalina's population, which depends on a system of wells and reservoirs in watersheds across the Island for freshwater. This system relies significantly on rainfall to recharge groundwater in these watersheds. Over the last 20 years, as prolonged drought has become more common, the draw on freshwater resources has outpaced the amount of precipitation the Island receives. The Project will help to reduce the amount of rainfall lost to runoff in these watersheds by restoring native vegetation and by capturing moisture from fog. The Project will help replace invasive annual grasses with native woody vegetation which is structurally well-suited to capture water droplets on leaves and branches. This captured water then permeates into the soil and groundwater supply, reducing the amount of moisture lost to evaporation.

The Project will also help mitigate the risk of wildfire to Avalon and other inhabited areas of the Island. Invasive annual grasses are a significant contributor to wildfire risk because they are highly ignitable, allow fire to spread rapidly, and quickly regrow after fire. Some firefighters compare the spread of wildfire in grasslands to gasoline that has been ignited since it spreads quickly over large areas. These factors promote a higher frequency of fire, a pattern that would not be healthy for the Island ecosystem or the inhabitants of Avalon. Invasive grass dominated ecosystems create a negative feedback loop. Once grasslands are established, more fire occurs, and more chaparral converts into grasslands. The Project will help to reduce the presence of these flammable invasive annual grasses across the Island and restore these areas with native chaparral, which naturally burns much less frequently and is less ignitable than invasive grasslands This is because chaparral plants are mostly evergreen shrubs that retain more moisture throughout the year, are less likely to ignite in the first place, and burn slower if they do ignite. Fire Safe Councils in towns like Santa Barbara and San Diego promote oaks, shrubs, and sages because they have a higher moisture content and are less likely to ignite and spread fires (CNPS, bewaterwise.com, Centers, Payne, & Diego, 2025).

1.2 Catalina Island Habitat Restoration and Monitoring Plan

As part of the broader Island Restoration Project, the Conservancy is implementing an integrated island-wide strategy to restore ecological function, reduce wildfire risk and rebuild resilient native habitats. A foundational component of the Island Restoration Project is the development of a science-based planning and monitoring framework that identifies where active restoration is needed and what conditions are required for successful recovery. The Conservancy contracted with Land IQ to develop a landscape-scale *Catalina Island Habitat Restoration and Monitoring Plan.* The Habitat Restoration and Monitoring Plan identifies suitable habitat restoration targets for degraded island vegetation communities, provides restoration principles that leverage natural ecological processes, prioritizes restoration opportunities by watershed management unit, and provides best practice for high quality, cost-effective habitat restoration and enhancement at the landscape-scale to support the long-term conservation and restoration of the Island's unique ecosystems. The Habitat Restoration and Monitoring Plan incorporates a Long-Term Monitoring Plan that will monitor changes in vegetation and island ecosystem health over time to assess progress toward restoration goals and responses to the removal of deer.

The Habitat Restoration and Monitoring Plan makes clear that meaningful landscape-scale restoration cannot occur without addressing the ecological stressors that have shaped the island for decades, most notably chronic browsing pressure from introduced deer. Their presence fundamentally limits the Conservancy's ability to implement the restoration strategies identified by the Habitat Restoration and Monitoring Plan and to achieve the broader Island Restoration Project objectives

Removing deer from Catalina is a critical component of achieving the Project's goals, as their continued presence and browsing habits inhibit the restoration of native vegetation and habitat. However, the Conservancy anticipates that many sites will not recover passively because the seed bank has been depleted, the site has been invaded by invasive annual grasses, and/or the site has lost significant topsoil. Many of these degraded sites are at the top of watersheds and impact everything downstream. These top-of-watershed sites are high priority restoration areas. Restoration efforts without fencing have been unsuccessful due to deer browsing. Thus, prior to removal of the deer, the Conservancy and its partners will erect a 10 acres exclosure to exclude deer and begin testing active restoration methods from herbicide applications, native seed mixes, container plantings, and recovery monitoring methods.

Together the Habitat Restoration and Monitoring Plan and Long-Term Monitoring Plan provide the scientific basis for restoration actions while deer removal creates the ecological conditions necessary for those actions to succeed, aligning all components of the Island Restoration Project toward long-term recovery of Catalina's native ecosystems.

1.3 Public Outreach Concerning the Restoration Project and Invasive Mule Deer Removal

Initial public outreach about the Restoration Project started in 2022 and 2023 through early conversations with stakeholders about the proposal to remove the nonnative mule deer and its importance to the overall Project. The Conservancy spoke to more than 70 community leaders on the Island, including longtime residents, business owners, frequent hunters, and members of the local humane society, to receive their feedback and input on the deer removal proposal.

On May 27, 2023, the Conservancy hosted some Gabrieleno-Tongva representatives on the Island to discuss the problems the invasive mule deer cause as well as the formation of an ongoing Indigenous community collaborative initiative among the Conservancy and tribal representatives to ensure continued dialogue. The Conservancy also provided the full details of the deer removal plan to the tribes and solicited feedback at an additional meeting on October 23, 2023. The Conservancy hosted the tribes again in 2024 and signed a Memorandum of Understanding in September of 2025 with representatives of the Gabrielino Tongva Tribe, Gabrielino Tongva Indians of California, San Gabriel Band of Mission Indians Gabrieleño/Tongva and Gabrielino-Shoshone Nation of Southern California.

The Conservancy hosted two advisory committee meetings on June 16 and July 28, 2023. Invitees included representatives from the Catalina Island Tourism Authority, the Catalina Island Company, the Wrigley Institute of Environmental Studies, Southern California Edison, as well as the local veterinarian, city representatives, local hunters, and hunting guides. The first advisory committee meeting focused on describing the problem that nonnative mule deer pose to the Island and included a site visit to the Catalina Island Restoration Area. This are fenced shortly after the 2007 Island Fire to prevent deer access and has shown what's possible through natural recovery without deer impacts. The second meeting involved a discussion of the potential solutions to this challenge, in which the Conservancy received suggestions and thoughts on the Proposal.

In early October 2023, the Conservancy published a website providing information and resources concerning the proposed deer removal and set up an email address to receive comments from the public. On October 17, 2023, the Conservancy presented details about the Catalina Island Restoration Project, including the proposed deer removal, to the Avalon City Council during the City Council's regularly scheduled public meeting. Conservancy staff listened to public comments about the proposal before the Conservancy's presentation.

To further engage with the public, the Conservancy began offering free tours of the Catalina Island Restoration Area. These tours provided more information on the damage deer cause to the Island ecosystem and were publicized as an opportunity to directly ask Conservancy staff questions concerning the Project and deer removal. The first tour was offered on October 25, 2023 for the local Rotary Club. Additional tours were offered starting in November 2023 through February 2024, on about five days per month, with both morning and afternoon times available, as well as both weekdays and weekends. These tours were advertised in The Islander local newspaper, and as flyers posted on community bulletin boards, locally targeted advertisements on both Facebook and Instagram, and at the City Council Meeting on October 17. A total of 30 individuals joined the tours.

On January 31, 2024, the Conservancy held a Community Forum at the Avalon Theatre on the Project and Proposal. The event was hosted by an independent moderator and included several experts from outside the Conservancy including The Nature Conservancy, UC Davis, and the National Park Service who have worked on invasive animal eradications on islands as panelists. The event was made as inclusive as possible through in-person and online viewing options and a live Spanish translation online. Questions from the public were received during the registration process as well as through handwritten cards at the event. Multiple questions were answered during the event, with many more gathered and posted with answers on the project's webpage.

The Conservancy has also hosted three "Community Conversations" on September 11, March 18, March 1, April 8, July 7, and September 3 2024. They continued in 2025 on October 14, November 12 and December 9. These events provided conversational public engagement opportunities, to allow the public to ask additional questions, and discuss the Project and Proposal directly with Conservancy leadership.

Additionally, the Conservancy has been interviewed by a variety of media outlets to answer questions on the Catalina Island Restoration Project. Conservancy staff has been interviewed by The New York Times, Los Angeles Times, LAist, ABC7, The Catalina Islander, KTLA, GearJunkie, Fox News online, OpenSpaces, local radio station KISL, CBS National News, the London Times, among others.

The Conservancy hosted a Last Friday Lecture Series titled Preserving the Catalina Island Fox with Katie Elder on July 26, 2024. In 2025, the Catalina Island Conservancy put on two events: Catalina Speaker Series: Spotlight on Protecting and Restoring Catalina's Amazing Oak Ecosystem on April 25, 2025 and A Community Conversation About Wildfire Prevention and Collaboration on February 28, 2025.

The Conservancy was asked to present in front of the LA County Fish and Wildlife Commission in May 2024, October 2024, and November 2025.

The Conservancy provided further public engagement by offering free tours of the fenced Catalina Island Restoration Area. These tours show the importance of restoring Island habitat, provide more information on the damage deer cause in the interior of the Island, and are an opportunity to directly ask Conservancy staff questions. These tours were offered starting in November 2023 through January 2024, offering four to six tours per week, using extensive outreach in the local newspaper and on social media. In total, 30 local Island residents attended a tour. Three more tours were provided in 2025 in November.

The Conservancy listened to the community's strongest concerns and interests and made several key changes to the Plan:

1) **Aerial shooting**-The Conservancy removed aerial shooting from the project and elected to pursue the next most effective method-ground based shooting by specialists and detection dogs as the primary removal methods.

2) **Carcas Utilization**- A subset of the carcasses will be gathered and given to support the Condor Recovery Program.

2. History of Introduced Ungulates on Catalina Island

2.1 Removed and Managed Ungulates (hooved animals)

Large ungulate herbivore introductions on Catalina Island began as early as 1827. These introductions include goats (*Capra hircus*) in 1827, cattle (*Bos taurus*), and sheep (*Ovis aries*) in 1863, pigs (*Sus scrofa*) in the 1920s, bison (*Bison bison*) in 1924, mule deer in 1928 (Landis, 2000) and black buck antelope (*Antilope cervicapra*) in 1968. The historical presence of these large herbivores has significantly altered the vegetation communities on Catalina (Landis, 2000; Laughrin, Carroll, Bromfield, & Carroll, 1994; Knapp, 2009; Minnich, 1982; Knapp, 2005; Manuwal & Sweitzer, 2007). Subsequently, nearly all introduced herbivores have been removed, including sheep in the 1920s, cattle in 1954, pigs ~2004, goats ~2005, and blackbuck antelope ~2008. Although the Conservancy knew of the damage deer caused to the

landscape, it decided to focus on removing the feral ungulates, pigs and goats first. The introduced bison population is managed by the Conservancy through an immunocontraception program. The herd was once as large as 527 individuals, but there are currently less than 80 individuals living on Catalina. The bison herd no longer is reproductively active.

2.2 Invasive Mule Deer Management

2.2.1 Introduction & Early Translocation Attempt

Newspaper archives indicate two mule deer were initially introduced to Catalina in 1928 and eight more in 1930 under a permit issued by the State Division of Fish and Game (Bruce, 1948; Day, 1948). Because the deer had no natural predators on the Island, the population boomed to 2,500 in less than a decade. The challenges deer posed to the Island were documented as early as 1947, when it was recorded that, "*Free from predation by coyotes, lions, and other hereditary enemies, excepting occasional forays by bald eagles seeking helpless fawns, the deer herd grew by leaps and bounds. When drought, such as exists this summer, parches the highlands, the deer move right into the irrigated areas*," (Long Beach Press-Telegram, 1947). The Catalina population of deer were surveyed as part of a statewide surveying effort conducted from 1948 to 1950, which determined that there were 2,000 deer on Catalina in 1949 (Longhurst, Leopold, & Dasmann, 1952).

Reports from Avalon of deer stripping away plants, climbing staircases, and even eating poison oak prompted the Catalina Island Company to ask the Fish and Game Commission for a solution (Long Beach Independent, 1948). It was proposed to round up the entire deer population and ship them off Island (Portland Press Herald, 1948). The Catalina Island Company decided the best option would be to shoot the deer, but the Fish and Game Commission was concerned about the public perception (Cedar Rapids Gazette, 1948). It was eventually decided to ship the deer off the Island, but this ultimately failed. The necessary traps were cost prohibitive and though the intention was to remove all the deer from the Island, only 150 were trapped. Furthermore, of the 150 deer that were trapped, only 110 survived the capture and transportation to the mainland (Long Beach Press-Telegram, 1948).

2.2.2 Hunting & Private Lands Management Agreement

Because of the unwillingness for a complete cull and the inability to ship the deer off the Island, a hunting season was started in 1949 (Long Beach Press-Telegram, 1949). The hunting season in 1949 was set between November 1 and January 31 (La Verne Leader, 1949). A total of 477 deer were taken, although the Fish and Game Commission was hoping for 1,250 (Palm Springs Desert Sun, 1950).

When cattle ranching moved off the Island in the 1950s, more vegetation was available for the deer to consume, though the ecosystem damage they cause was not recognized at the time. As the State began to better recognize the importance of deer population control, Catalina Island was credited as the first location in the state to encourage antlerless hunts and also asked for a higher ratio (60:40) of does to bucks (Oakland Tribune, 1964; Longhurst, Leopold, & Dasmann, 1952; Associated Press, 2014).

Deer hunting has occurred on Catalina nearly every year since 1949, yet deer overpopulation has persisted. Issues of inconvenient and expensive transportation to the Island and unclaimed tags have been a longstanding problem. For many hunters, the need to obtain a deer tag made them prefer to hunt pigs and goats instead. Hunters also reported that deer population numbers were high, but that the deer were small (Culpepper, 1968).

In 1998, the Conservancy entered a Private Lands Management (PLM) agreement with the California Department of Fish and Game hoping to increase hunting to reduce the deer population. Before this, the deer hunting program was managed by the state of California and hunters were required to visit the Long Beach Department of Fish and Game office to receive tags specifically for Catalina Island. The number of deer taken remained very low under the new PLM program. Between 1998-2001 the Conservancy worked with an outfitter to help guide hunts in the interior of the Island, but that effort did not harvest enough deer to reduce deer populations. Between 2003-2008, another outfitter was hired, Wildlife West Inc. (Wildlife West), who helped increase the take on Catalina. Wildlife West was then contracted again from 2011 to 2024. As seen in Exhibit A, the total harvest numbers have markedly increased under the PLM, with over 200 deer being taken in all but two years since 2003, compared to the years prior which failed to ever exceed 150. However, Catalina's deer population has not materially decreased during this time (Table 1).

Year	Pop Estimate	Total Deer Harvested	Percent tag success	Hunt Mortality (% of Population)
2010	NA	180	66%	NA
2011	NA	282	79%	NA
2012	2619	310	80%	11.84%
2013	2541	309	77%	12.16%
2014	1227	225	66%	18.34%
2015	1474	217	68%	14.72%
2016	2372	244	71%	10.29%
2017	NA	207	65%	NA
2018	2061	223	66%	10.82%
2019	1341	181	57%	13.50%
2020	NA	221	65%	NA
2021	1771	245	64%	13.80%
2022	NA	207	47%	NA
2023	NA	320	64%	NA
2024	1800	379	50.30%	21%

2025	2040

Table 1. Deer Population Estimate with harvest numbers

In 2007-2008, the Conservancy requested an additional 200 tags, 700 tags total, increased the number of hunting guides, subsidized the costs of the tags and the costs of the hunts, and provided vehicles and staff to support the PLM program. Additionally, the Conservancy conducted public outreach to increase awareness of the deer hunting opportunity on the Island. Yet, even with this immense investment to make hunting as cheap, accessible, and popular as possible, the number of deer taken remained low in comparison to the overall population with 402 deer taken in 2007 and 254 taken in 2008.

Throughout the history of the PLM program, and particularly since the Island Fire in 2007, the Conservancy has worked to make the hunting program more accessible to the public. The Conservancy also petitioned the Fish and Game Commission to expand the hunting program which resulted in Catalina hosting the longest hunting season in the state (July-December). To increase the number of local hunters, the Conservancy also paid to train Conservancy staff as hunter safety educators and provided free hunter safety training to residents of the Island. To make it more affordable, the first hunting tag for residents of the Island were given out for free despite the costs to the Conservancy. In 2025, up to two hunting tags were made free for local residents. In addition to tag fees, there have been other financial costs to deer hunting that cannot be overcome. For example, liability insurance can cost a hunter $50. This insurance is required because of the inherent risks involved in hunting and to the Conservancy as a small non-profit. Another cost is the price of travel and lodging on the Island. These aspects make further increasing subsidies for the PLM program financially unsustainable for the Conservancy. For example, in 2024, the Conservancy invested over $470,703 to increase hunting in the interior and made hunting free to locals. The Conservancy partnered with Rivers of Recovery and provided vehicles and lodging to allow veterans to hunt through this partnership. The Conservancy also continued to work with Wildlife West, partnered with Wounded Warriors, and allowed non-locals to hunt using e-bikes or shuttles to access the wildlands of the Island. This effort yielded only 379 deer harvested out of the 754 tags claimed. In the process, eight safety incidents were reported that included hunters entering residential homes without prior warning, shots near fox vaccination teams twice, and hunters shooting in the town of Avalon which is off limits. Resources were shifted away from Conservation initiatives such as invasive plant work and volunteer events to manage the hunting season. The hunt ultimately ended with a net loss of $256,108 to the Conservancy and the following year the deer population increased from 1,800 individuals to 2,040 in the interior of the Island (Table 1). In Avalon, the population increased from 55 in 2024 to 149 in 2025.

This outcome can be explained by compensatory mortality. This ecological concept means that animals taken by hunting are often the same individuals that would have died soon anyway because of limited food, drought, disease, or competition. In these cases, hunting doesn't increase the total number of deaths — it simply replaces deaths that would have occurred naturally, so the overall population size changes very little(McCullough, 1979). Research on hoofed mammals (ungulates) shows that when a population is temporarily reduced, the remaining animals often have higher survival rates. This effect is especially strong in places without predators. As a result, the population compensates for the losses and can rebound quickly (Festa-Bianchet, Gaillard, and Côté 2003). This means that even large or subsidized

hunting programs may only produce short-term declines before the population grows back. Catalina has seen this pattern as well, which aligns with broader ungulate research (Bender, G.A., Spencer, McAllister, & Murphie, 2004).

Between 2012 and 2024, the population of deer has ranged in size from a high of 2,619 in 2012 to a low of 1,227 deer in 2015, with a mean of 2,153 deer, despite an average take of about 350 deer every year over that same period. Both the deer population and number of juveniles detected had a positive relationship with the rainfall amount during the prior year. This data suggests that the mule deer population size is controlled more by forage production than the level of harvest during a hunting season (Stapp, Hamblen, Duncan, & King, 2022)

Catalina has an average annual precipitation of 14 inches (Yoho, Boyle, & McIntire, 1999); however, there is a wide variable in total precipitation in any given year (Table 2). During the last decade, annual precipitation has fluctuated from as little as 4.20" to 20.92". This corresponds with fluctuations of abundant years of forage with a positive reproductive response from deer to subsequent years of very little vegetation growth during drought years, which reduces the deer population through starvation. For example, the successive drought years 2014/2015 and 2015/2016 followed by an above average rain year (2016/2017) of 15.78" to be followed by one of the driest years on record (4.2") in 2017/2018 led to high numbers of emaciated deer observed throughout the Island and in the town of Avalon where many deer searched for forage in resident's landscaping. Six of the last ten years have been below average rainfall years, and with the increased seesaw effect of precipitation driven by a changing climate.

Table 2. Precipitation by season

Precipitation Season	**Precipitation as Rain in Inches**	**Deer population the following year (year)**
2015-2016	8.13	NA
2016-2017	15.78	2061 (2018)
2017-2018	4.20	1341 (2019)
2018-2019	17.31	NA (2020)
2019-2020	12.31	1771 (2021)
2020-2021	4.35	NA (2022)
2021-2022	7.55	NA (2023)
2022-2023	18.87	1800 (2024)
2023-2024	20.92	2040 (2025)

Deer not only contend with years of very low forage, they also live with an over-abundance of cactus. It is reasonable to suspect that cactus is unnaturally abundant due to its natural physical defenses to herbivore eating habits and the last two centuries of over-browsing by

introduced ungulates (Salladay & Ramirez, Herbivore Preference of Island Chaparral Shrubs Compared to Mainland Relatives, 2018; Bowen & Vuren, 1997). Cactus without any control filled the gap left by the removal of endemic plants once abundantly diverse across the landscape. Deer suffer from the injurious spines of the cactus as seen in the images taken by hunters dressing their deer in the field (Fig. 1).

Figure 1- Cactus spine injuries on mule deer revealed after successful dispatch. Photos taken by hunters dressing their harvest on December 5th (left and center) and December 26th (right), 2021.

2.2.3 Caged Outplantings & Exclosure Fencing

The Conservancy's efforts to conduct any restoration vegetation outplantings to improve habitat and save rare species from extirpation or extinction without fencing or cages have all failed. In the absence of effective control of the deer population across the Island, the Conservancy has utilized a two-fold strategy for conservation and restoration of native plant communities and wildlife habitat. First, in high-visibility areas where vegetation type conversion has occurred and where road access is possible, restoration plantings of select species have been undertaken, using t-posts and wire mesh to protect individual plants. This is a capital- and labor-intensive strategy, with very limited utility as the cages cannot be removed without exposing the plants to intense browse from the deer as seen in Figure 2 and Figure 3.

Figure 22: Catalina cherry (*Prunus ilicifolia* ssp*. lyonii*), a Channel Islands endemic, in cages at Haypress Restoration Area. Note the basal sprout on the cherry within the intact cage (left) compared to the browse damage and lack of basal sprouts on the cherry in the cage that has been compromised (right). Cages cannot be removed from plants even into maturity without jeopardizing their long-term health as many species depend on resprouts to replace old growth. Photos taken 1/19/2023.

Figure 3: Island mountain lilac (*Ceanothus arboreus*) outplantings in Bulrush Canyon. In the foreground, a compromised cage has allowed the plant inside to decimated by mule deer browse and left with very little vegetation. Note the now bare center stem that extends the height of the photo. Compare this plant with those in the background which show far more vegetation, yet they are still unable to grow beyond the cages due to mule deer browse. Photo taken 11/17/2022.

Second, the Conservancy also relies on a network of 39 deer exclosures to protect habitats from deer browse, ranging in size from 0.02 hectares to 45.44 hectares. In total, 89.94 hectares are protected by fencing, representing 0.4% of the Island's total land area. Following a fire in 2000, the Conservancy invested heavily in deer exclosure fences to protect remaining native plant communities and wildlife habitat (Aguilera, 2000). The largest investment occurred in 2007-2008 following the 2007 Island Fire which burned 10% of the Island, after which the Conservancy erected eight miles of 8-foot deer fence (Rhein, 2008). Of 2,516.34 hectares burned since 1999, 29.71 hectares have been fenced – just 1.18% of the fire-impacted land area. Protecting even this small proportion of post-fire regenerating habitat comes at a considerable expense, and maintenance poses a significant challenge. The overall cost of simply installing the fenced areas has easily exceeded $3,000,000, with a single fenced exclosure costing $1,000,000 in 1999.

The Catalina Island Restoration Area, one of the fenced exclosures erected after the 2007 Island Fire, is a 7.99-hectare area above White's Landing to protect many rare, listed, and endemic plant species that emerged naturally from the soil seed bank after the fire. The fenced area originally protected 44.2-hectares, but was reduced to a more maintainable size due to the difficult terrain. Today, the area protects healthy habitats that are not present outside of the exclosure due to deer browsing. An important function of this fenced area is not just conservation of the native plants it protects but also demonstrating the biodiversity and richness that could occur across the Island without the detrimental impact of deer. Inside this fenced area are populations of at least five Catalina endemic plants, such as the Santa Catalina Island manzanita (*Arctostaphylos catalinae*), Trask's yerba santa (*Eriodictyon traskiae* ssp*. traskiae*), Catalina ironwood *(Lyonothamnus floribundus* ssp*. floribundus*), Santa Catalina Island bush-mallow (*Malacothamnus fasciculatus* var*. catalinensis*), and Santa Catalina Island bedstraw (*Galium catalinense*), as well as all three of the California lilac (*Ceanothus* spp.) taxa in high abundance. One federally threatened plant, island rush-rose (*Crocanthemum greenei*) continues to emerge since 2007. Within the Catalina Island Restoration Area , rare plants are more common, providing necessary habitat to wildlife and pollinators on the Island as seen in Figure 4. It is common to see the endemic Santa Catalina Island fox*,* Catalina Hutton's vireo, and Catalina California quail within the restoration area.

Figure 4: Catalina Island Restoration Area, fence line marked in red, within the footprint of the 2007 Island Fire. The left side of the photo shows the inside of the fenced area while the right side shows the outside of the fence. Note the stark difference in the endemic island bigpod ceanothus (*Ceanothus megacarpus var. insularis*), which is in full bloom with white flowers, inside the area compared to outside. Island bigpod ceanothus struggles to successfully grow outside of protected areas due to deer browsing pressure. Photo taken 2/29/24.

3. Necessity of Eradicating Invasive Mule Deer from Catalina Island

3.1 Evidence of Ecological Damage from Invasive Mule Deer

3.1.1 Harm to Native Plant & Animal Populations

Islands, such as Catalina, are *at-risk* biodiversity hotspots. Islands support approximately 20% of Earth's biodiversity and 50% of threatened species on just 6.7% of the globe's land surface area (Fernandez-Palacios, et al., 2021). The arrival of introduced species to islands is a major threat to this biodiversity with invasive species a primary driver of recent extinctions (Bellard, Cassey, & Blackburn, 2016). In fact, 61% of global extinctions since the 1500s have taken place on islands. Eradicating invasive vertebrates is an essential island restoration tool to address this issue (Spatz, et al., 2022) Impacts from overabundance and introductions of deer and other animals on biodiversity have been well established in scientific literature (Côté, 2004; Anderson, 2003; Anthony, 2019; Bowen & Vuren, 1997; Coblentz, 1990; Diamond, 1989). On Catalina, introduced mammals have substantially impacted the landscape – at least 48 native plant species have been eliminated by feral animals (Thorne, 1967). On the Channel Islands overall, feral ungulates have taken a considerable toll on the native vegetation, reducing standing biomass and accelerating erosion. This creates a feedback loop where the loss of plant cover exacerbates soil loss and impairs water retention, making the landscape even less hospitable to plants and more vulnerable to impacts from introduced animals (Minnich, 1982; Vitousek, 1988).

The ecological damage that the nonnative mule deer cause to native plant populations on Catalina has been thoroughly documented (Manuwal & Sweitzer, 2007; Jacobsen, Pratt, Alleman, & Davis, 2018; Salladay & Ramirez, Reduced Defenses and Increased Herbivore Preference of Island Chaparral Shrubs Compared to Mainland Relatives, 2018; Stapp, Hamblen, Duncan, & King, 2022; Knapp, 2010; Dvorak & Catalano, 2016; Knapp, 2005; Ramirez, Pratt, Jacobsen, & Davis, 2012). The removal of livestock and feral animals from Catalina in the past has helped to put the Island on a trajectory of recovery (Knapp, 2014) and the Conservancy has documented natural revegetation of the Island from prior ungulate removals. But the species that are able to regrow are deer-resistant species that are commonly found across southern California, not the Catalina and Channel Islands endemic species that are necessary for the full biodiversity of Catalina to be represented. Native plants on Catalina have fewer chemical and physical defenses to deer than closely related mainland species and are therefore more susceptible to deer browse (Orians & Ward, 2010). This is because island varieties of plants have evolved without the presence of herbivores such as deer and therefore without the need to deter herbivores. In a forage palatability trial comparing plants from 10 matched taxonomic groups comprising samples from the mainland and Catalina, deer decisively favored browsing on the Island plants (Salladay & Ramirez, Reduced Defenses and Increased Herbivore Preference of Island Chaparral Shrubs Compared to Mainland Relatives, 2018).

The damage from deer is particularly harmful to vegetation communities post-fire when native seedlings begin to germinate to revegetate the landscape and reestablish the native habitat. An example of this can be seen in Figure 5 (Knapp, 2005). A study on Catalina of post-fire

regeneration for three woody resprouting plants (*Heteromeles arbutifolia, Rhus integrifolia,* and *Rhamnus pirifolia*) found that exposure to nonnative mule deer resulted in an eight-fold increase in plant mortality. In plots protected by fencing only 11% of resprouts died, in deer-exposed plots the die-off rose sharply to 88%. Deer browse also resulted in a greater than 93% reduction in canopy coverage among dominant shrub species, allowing for invasion by exotic species and vegetation type conversion (Ramirez, Pratt, Jacobsen, & Davis, 2012). Avalon Canyon, an area burned during the 2007 Island Fire, clearly displays how deer browse can alter landscapes post-fire. Areas outside of fenced exclosures in the burned area are currently dominated by flax-leaved broom (*Genista linifolia*), a highly invasive Mediterranean plant that deer do not consume. In contrast, areas protected from deer browse after the fire supported native plants four times the size of those outside the fenced exclosures (Jacobsen, Pratt, Alleman, & Davis, 2018). Over time, this disparity has translated into major population differences as seen in Figure 6. In fenced areas within Avalon Canyon, native plants (*Ceanothus arboreus* and *C. megacarpus*) are dominant instead of the invasive flax-leaved broom seen outside of areas exposed to deer. Throughout much of the Island, areas not protected from deer are dominated by invasive annual grasses which promote faster moving and more frequent fires.

Figure 5: A Goat Harbor exclosure, fence line marked in red, built in the early 2000s after a fire in 1999. Chaparral communities are adapted to persist after wildfires by resprouting new growth and germinating fire-stimulated seeds. However, the presence of mule deer post-fire can be disastrous. This photo shows the devastating effects that non-native mule deer browse has on post-fire chaparral regeneration. Inside the exclosure shows successful post-fire regeneration, with resprouting and new seedling recruitment resulting in green growth. In comparison, the outside of the exclosure shows the beginning stages of vegetation type conversion to non-native annual grassland due to mule deer browse on resprouts and new recruits. If these native plant species cannot resprout or recruit new seedlings after a fire, the vegetation community will shift to invasive species, and entire rare plant populations can be eliminated from the area. Pigs and goats had been removed at this time. Photo taken in 2005.

Figure 6: The Farnsworth exclosure, fence line marked in red, within the footprint of the 2007 Island Fire. The left side of each photo shows the outside of the fenced exclosure while the right side shows the inside of the exclosure. Note the stark difference in island mountain lilac (*Ceanothus arboreus*), a California Islands endemic, presence inside the exclosure compared to outside. Island mountain lilac struggles to regrow outside of the exclosure due to browsing pressure, especially evident in the bottom right photo where it is in full bloom with lilac flowers. Photos taken 5/24/2013 (left), 2012 (top right), and 2/28/2024 (bottom right).

Deer also directly threaten endemic and rare plant species on Catalina. The flora of Catalina contains 69 species or subspecies included in the California Native Plant Society's California Rare Plant Ranking system, listed in Exhibit B. These species include nine Catalina endemic plants and 37 Channel Islands endemic plants (including the Catalina endemics). Four species (*Cercocarpus traskiae*, *Pentachaeta lyonii*, *Sibara filifolia,* and *Crocanthemum greenei*) are federally listed endangered or threatened species. Two of these species (*Cercocarpus traskiae* and *Pentachaeta lyonii)* are listed as endangered by the state of California.

The island rush-rose (*Crocanthemum greenei*) is a federally threatened species found only on the Channel Islands. Following the 2007 Island Fire, growth and reproductive success of the island rush-rose was measured across the Island, within and outside protective exclosures. Populations exposed to deer browse showed markedly lower reproductive success, with 58% of those populations failing to produce any seeds. However, populations protected by fenced exclosures contained plants of significantly larger size, and 100% of plants in protected areas successfully fruited, regenerating the soil seed bank (Dvorak & Catalano, 2016).

Several other sensitive plant species on Catalina are at risk because of the deer. The endemic Catalina Island mountain-mahogany (*Cercocarpus traskiae*) is a state and federally endangered species and is nearly extinct in the wild with only six known individuals remaining. Goats, pigs, and deer have all contributed to its decline, rendering it one of the rarest woody plants in North America. A single fence that the Conservancy installed in 1999 prevents deer from eliminating the last individuals of Catalina Island mountain-mahogany in the wild. Additionally, the vast majority of the federally endangered Santa Cruz Island rockcress (*Sibara filifolia*) individuals on Catalina are found within this protected area, with the Santa Barbara Botanic Garden suggesting the plant was previously more widely distributed on Catalina but had the best chance of persisting where it was protected from deer (Schneider & Mason, 2023). The southern island mallow (*Lavatera assurgentiflora* ssp. *glabra*) occurs on just two rocky islets off the northeast coast of Catalina, which deer cannot access. The total population of southern island mallow is estimated to be fewer than 200 plants.

Restoration of these Channel Islands endemic has so far proved impossible beyond fenced restoration areas; future success is dependent upon effective deer removal. Additionally, the Island scrub oak (*Quercus pacifica*) is thought to have covered a third of Catalina as recently as the 1940s. In the intervening decades this oak habitat has declined by 31%. This dieback is driven by several factors, but ongoing acorn predation and browse on new growth by deer, as seen in Figure 7, is likely among the more significant impacts (Manuwal & Sweitzer, 2007).

The impacts of invasive deer on federally listed species on Catalina Island extend far beyond Catalina's borders. These same threatened and endangered species occur on other Channel Islands and mainland preserves managed by the U.S. Navy, Channel Islands National Park, The Nature Conservancy, and the Santa Monica Mountains National Recreation Area. These agencies are actively working to recover the very species that also persist on Catalina; however, full recovery and delisting across their range cannot occur while the threat of deer over-browsing on Catalina remains unresolved.

Many of these already rare species have experienced significant genetic bottlenecks due to historic over-browsing by introduced herbivores elsewhere in the Channel Islands. As a result, each island now carries a unique and irreplaceable portion of the species' remaining genetic diversity. Catalina's populations represent a critical piece of that diversity. Protecting and restoring them is therefore not only essential for the Island itself—it is foundational to the conservation, recovery, and long-term resilience of these species across their entire range.

Figure 713: An island scrub oak (*Quercus pacifica*) with basal resprouts. These reprouts have been browsed down to the ground by mule deer, inhibiting the replacement of older branches and reducing the likelihood of the oak surviving. Photo taken 5/19/2003.

For these reasons, the continued presence of deer on Catalina represents a significant threat to the Island's and the region's remaining diversity of native plants, and the animals who rely on these plant species for habitat and forage. On other islands around the world, the cascading effects of deer include negatively impacting bird species abundance on the Gulf and San Juan Islands (Martin, Arcese, & Scheerder, 2011) and lowering species density and abundance of insects on Haida Gwaii (Allombert, Stockton, & Martin, 2005). Catalina is home to over 45 species of endemic invertebrates and three endemic bird species that are likely impacted similarly. In fact, management recommendations for two of Catalinas endemic birds, the Catalina California quail (*Callipepla californica catalinensis*) and the Catalina Hutton's vireo (*Vireo huttoni unitti*), recognize the deer as an ongoing threat to these species due to the habitat destruction deer cause. The deer destroy areas to nest and available food. Because of this destruction, the authors suggest removing the deer from the Island (Shuford & Gardali, 2008).

3.1.2 Increased Wildfire Risk

Fire is a natural phenomenon in most Mediterranean-like ecosystems, including Catalina's. Catalina Island has fire-dependent shrubs and fire-following annuals, which indicates that fire has been a predictable presence on the Island historically. Following a fire, the natural return interval of chapparal ecosystems in California has been estimated to be between 40 to 100 years or longer Keely, Zedler, Zammit, & Stohlgren, 1989; Minnich, 1995; Missoula Fire Sciences Laboratory, 2018; Syphard A. B., 2019). On the Channel Islands, natural fire intervals may be even longer due to the inability of fires to spread from the mainland and the lower rate of lightning ignitions in coastal regions (Carroll, Laughrin, & Bromfield, 1993; Keeley, 2006).

Within the normal parameters of an ecosystem's fire regime, fire can be a regenerative force by which fire-following plants sprout and dead woody vegetation is recycled back into the environment. However, outside of these parameters, and depending on the biotic environment where the burn occurs, it can be a significant threat to biodiversity. In fact, many chapparal shrub species are eliminated in the area when fires return more than once within a decade and even fire adapted annual plants are quickly outcompeted by invasive annual grasses after frequent fire (Keeley, 2000).

Deer on Catalina are contributing to the vegetation type conversion of native shrublands and chapparal into invasive annual grasslands. A study on Catalina found that deer browse significantly decreased regrowth of dominant native shrub species and resulted in a >93% reduction in total shrub cover in areas unprotected from deer browse after fire, allowing for the conversion of native shrubland into invasive annual grasslands (Ramirez, Pratt, Jacobsen, & Davis, 2012). The impact of deer on suppressing shrub communities was documented on Santa Rosa Island to the north of Catalina as well, where areas that become naturally inaccessible to deer passively shifted back from the surrounding invasive annual grassland to native sage scrub (Cloud & Taylor, 2002).

This conversion of chapparal and shrub habitats on Catalina into invasive annual grasslands significantly increases the ignitability and risk of more frequent and faster moving fires on the

Island. These invasive annual grasses are well known for increasing the rate of ignition and spread of fires, initiating a feedback loop in which they create conditions that support even more frequent fires (Fig. 8) because invasive annual grasses are better able to survive and recolonize after fires compared to native plant species (D'Antonio & Vitousek, 1992; Mack & D'Antonio, 1998; Keeley, 2000; Brooks, et al., 2004; Park & Jenerette, 2019). Invasive annual grasses have resulted in significant increases in fire occurrence and frequency in ecoregions across the country and California in particular, including sagebrush systems where fire is otherwise naturally infrequent, by creating abundant, quick drying, and easily ignitable fuels (Fusco, Finn, Balch, Nagy, & Bradley, 2019). With the loss of chaparral due to deer browse and the resulting transformation of sagebrush habitat into invasive annual grasslands, Catalina is likely to experience more frequent fires than if it had its intact native plant communities.

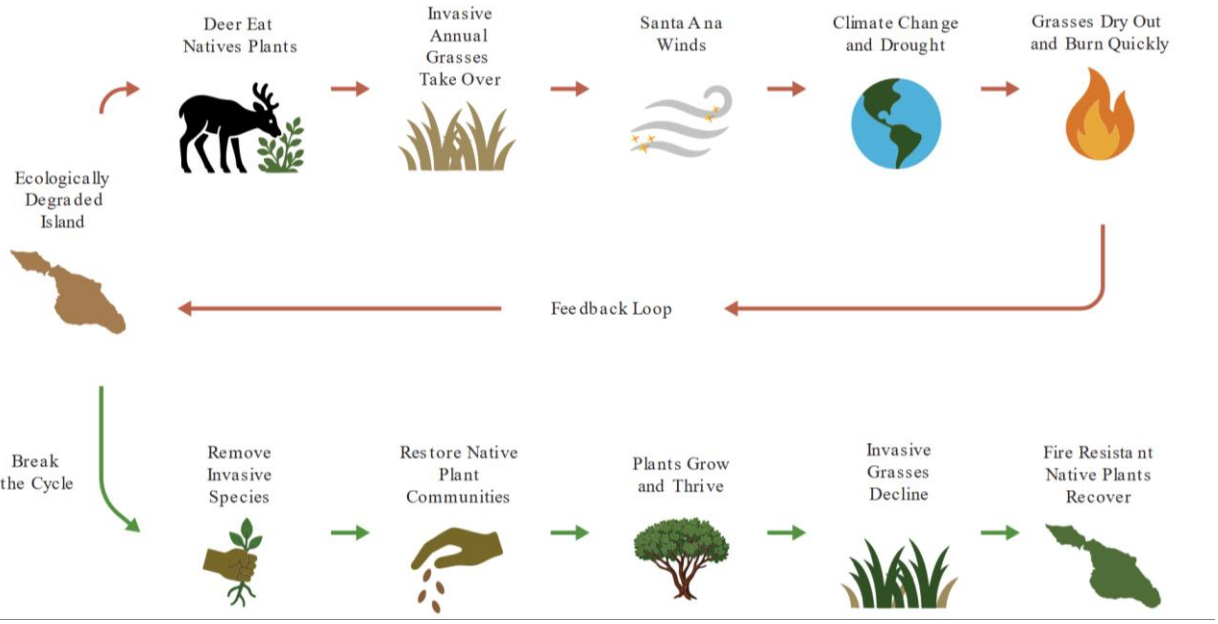

Figure 814: The cycle of increased fire frequency on the island due to the presence of deer. When mule deer eat native chapparal on the Island, invasive grasses take over.

Removing the deer from the landscape will restore native chapparal habitats which will reduce fire frequency on the landscape. A study on coastal sage scrub communities conducted in Southern California suggests that reestablishing native shrubland can lengthen fire return intervals due to shrub communities having discontinuous canopies and retaining higher moisture content longer into the growing season than grasslands (Cione, Padgett, & Allen, 2002). This contrast in moisture retention is also found in the fuel size classifications used by firefighters and prescribed fire practitioners to describe downed dead material. Finer fuels like grasses are called one-hour fuels because they rapidly lose moisture in dry conditions and allow fires to spread quickly, whereas the branches of shrubs are considered 10-hour and 100-hour fuels since they take longer to dry out (Cowan, Adlam, & Berger, 2023). The regeneration of native chaparral and shrublands after the removal of deer will reduce the amount of easily

ignitable, flashy fuels present across Catalina by replacing areas of continuous invasive grass with plants that retain more moisture and are harder to ignite.

Reducing Catalina's grasslands will have incidental public benefits as well. Decreasing the abundance of invasive annual grasses is key to reducing catastrophic fire risk to Catalina and the town of Avalon. Research has shown that when fires occur, significant property loss is more likely to occur when the surrounding fuel type is invasive annual grasses as opposed to shrubs (Syphard, Keeley, Massada, Brennan, & Radeloff, 2012). Most recent fires on the Island have had human causes such as escaped campfires, risky use of power tools, plane crashes, downed power lines, vehicle fires, and equipment, suggesting that the risk of fire will always be present. While fire is a natural part of the Catalina ecosystem, evidence shows that native woodlands, chaparral, and shrublands are less likely to ignite, burn slower, and have a longer interval of return (40-100 years) than the invasive annual grasslands (3-5 years) that the deer facilitate. Thus keeping deer on the Island will increase the risk of wildfire both endangering the wildlands and the community of Avalon.

The role that introduced ungulates have in increasing wildfire risk is evident in the case of the 2023 Hawaii wildfires. Experts note that invasive ungulates, specifically goats, suppressed native plant communities on Maui and facilitated the spread of invasive grasses. It has been indicated that restoration and fire risk reduction cannot be achieved on Maui without the removal of feral goats (Rubinoff & Gon III, 2023). Catalina faces a similar challenge with the deer population and must appropriately manage the population.

3.2 Inability of Alternative Methodologies at Managing Invasive Mule Deer

The Conservancy has attempted or investigated several alternatives to address the harm deer cause to the Island, including translocation, hunting, fencing, and fertility control. Removal through aerial hunting is the most efficient, effective, and humane option, but a contingent of the public sees views this method as "unfair" or "unsportsman-like". Thus, the Conservancy has agreed to only use helicopters in a supporting role with no shooting from an aerial platform. All deer will be removed using rifles discharged from the ground by specialists. Other proposed methodologies have proven to either not permanently remove the negative impact of the deer, not be feasible due to the existing population size and Catalina's terrain or not be humane for the animals.

3.2.1 Translocation

Translocation to the mainland has been attempted on Catalina, and other islands as well, but is not feasible given the current population size, estimated in 2025 to be about 2,040 deer in the interior and 149 in Avalon. The Island's rugged terrain is too steep and isolated in many locations to safely deploy crew members to attach sedated animals to helicopters to even attempt translocation. Additionally, capture and translocation are not optimal for the animal's welfare. In 1948, there was an attempt to capture all the deer on the Island and transfer to the mainland, which was estimated at about 2,000 at the time. Only 150 were caught and just 110 survived the relocation (Long Beach Press-Telegram, 1948). The loss of life may be attributed to

the fact that capture methods in general have an equal or worse welfare rating prior to death than shooting, and the welfare impact is made even worse by transportation (Sharp & Saunders, 2011). This is because chemical immobilization, capture, and translocation can induce capture myopathy, a non-infectious disease characterized by muscle damage from extreme exertion, struggle, or stress in deer (Beringer, Hansen, Wilding, Fischer, & Sheriff, 1996). Additionally, translocated deer are unaware of their new surroundings, including the locations of resources and the presence of predators and high volumes of traffic – two factors that deer on Catalina are completely naïve to (Pennsylvania Game Commission). For example, only 15% of translocated deer from Angel Island in the San Francisco Bay Area survived after the first year of transportation to the mainland, with malnutrition, vehicle accidents, and predators being contributing factors to their low survival rate (O'Bryan & McCullough, 1985). Researchers have observed that, "The principal reason for translocating deer from metropolitan preserves to rural locations is to reduce local abundance without killing deer. The reality of this choice is that translocation may result in the deaths of more than 50% of these deer during the first-year post-release." (Jones & Witham, 1990). Experts have further expanded on this, stating that "The 'rescue,' rehabilitation and release of wild animals are highly risky activities from disease and other perspectives. There is little evidence to justify this activity either from an ethical or an ecological perspective. It is assumed that the release site is already at capacity for deer, and transporting relocated deer to these sites upsets the natural balance already in place by increasing competition for food resources by the new deer. Many released animals will die, and wild populations will not benefit from this practice, but are more likely to suffer problems such as disturbance, territorial aggression, genetic pollution, and introductions of disease (Kock, Woodford, & Rossiter, 2010).

3.2.2 Recreational Hunting

Recreational hunting has been shown to be ineffective at controlling the deer population on the Island and elsewhere (Giles & Findlay, 2010; Simard, Dussault, Huot, & Côté, 2013; Perez-Gonzalez, 2024). One study found that even when 93% of harvest objectives were met, deer density, vegetation abundance, and vegetation growth did not vary significantly between control experimental sites (Simard, Dussault, Huot, & Côté, 2013).

Because of Catalina's rugged terrain recreational hunters have never been and are unlikely ever to be able to take a high proportion of Catalina's deer population. Additionally, deer have learned to avoid hunters throughout the hunting season by going to Avalon, making many deer inaccessible to hunting. Ultimately, recreational hunting is not a long-term solution to reducing the threat deer pose to Catalina's ecosystems. It has not succeeded in adequately controlling the deer population (Stapp, Hamblen, Duncan, & King, 2022), and a further expansion in recreational hunting would not eliminate the negative impacts of the deer, likely due to compensatory mortality.

Compensatory mortality in deer populations, particularly in the mule deer, is a complex biologic al process influenced by various ecological factors. This process shows that when the population drops, the remaining deer survive at higher rates, offsetting the losses. The remaining deer benefit from increased food resources, leading to a higher

reproductive rate (Bartmann, White, & Carpenter, 1992).

Maintaining or expanding the current PLM hunting program is less humane than fully removing the nonnative mule deer from Catalina. Hunting data shows that from 1982-2025 a total of 6,739 deer have been killed which far exceeds the number of deer that would need to be removed for this project. If the deer are not eradicated, these annual hunts will continue indefinitely into the future. As noted by the British Columbia SPCA regarding the humaneness of recreational hunting compared to eradication, indefinite management "would mean more deer suffering and being killed every year and would still not achieve the goal of long-term sustained ecological recovery" (BC SPCA, 2023).

3.2.3 Fencing

The Conservancy has relied on exclosure fencing and wire cages to protect sensitive plant species and plantings on the landscape for decades. While these efforts have helped protect limited areas of native habitat and minimal numbers of individual plants, it is not enough to contribute to meaningful restoration on the Island overall. In total, after a significant investment, <0.5% of the Island has been fenced. As seen in Figure 9, these isolated, contained plants and sites lack the connectivity that is necessary for the restoration to improve ecological processes across Catalina (McRae, Hall, Beier, & Theobald, 2012). For example, recruitment of new plants is not improved by caged plants because new seedlings are not protected from browsing by deer and are rapidly consumed outside of the cages as seen in Figure 10. Fencing and cages are not a long-term solution that supports the ecological conditions necessary for natural restoration to occur on Catalina and interconnectedness of island habitats.

These limitations demonstrate that fencing vegetation is not a viable long-term strategy for restoring ecological processes or reconnecting Catalina's habitats. Extending this concept to deer management highlights even greater challenges. Catalina's 48,000 acres of steep, rugged terrain make it impossible to construct and maintain a barrier that could reliably contain deer. Any fence would be highly vulnerable to storm damage, rockfalls, fallen trees, or general wear, allowing deer to breach the barrier and reinvade areas that had already been restored.

Beyond these practical limits, fencing deer into a smaller area would create serious animal-welfare concerns. Confinement would reduce access to food and water, heighten competition, and could result in starvation or poor body condition. Concentrating deer in restricted habitat is not humane, and for these reasons, fencing, whether used to protect plants or to contain deer, fails to provide a sustainable, effective path toward long-term ecological recovery on Catalina.

Figure 9: Caged plantings of the endemic Catalina Island ironwood (*Lyonothamnus floribundus* ssp. *floribundus*) at the Laura Stein Volunteer Camp. Note the lack of growth beyond the edge of the cage due to significant browsing from mule deer as well as the gaps between plantings. The plantings are unable to grow to their full potential and outcompete the surrounding non-native vegetation. Photo taken 10/10/2023.

Figure 10: To the left, a blooming Channel Island tree poppy (*Dendromecon harfordii*), endemic to the Channel Islands, flourishes inside the protection of an exclosure. In contrast, the right side of the photo shows a Channel Island tree poppy struggles to establish outside the exclosure due to heavy browsing pressure from mule deer. Photo taken 6/24/2010.

3.2.4 Fertility Control

Fertility control of the deer population through surgical sterilization or immunocontraception has not been attempted on Catalina as it was for the bison herd because it is not a feasible option to control the deer population. Although bison and deer are both introduced animals on Catalina, their degree of invasiveness and ecological impact is very different due to their distinct behavior and functional traits (Lundgren, et al., 2024). Deer are primarily browsers of shrubs, while bison are grazers of grasses. These factors influence how these two different nonnative animal species can be managed. Invasive grasses increase the risk of wildfire ignition, meaning there is a benefit to bison grazing invasive plant species.

Both surgical sterilization and immunocontraception would require the immobilization and capture of at least every female deer on the Island, which has been shown to be unachievable (Long Beach Press-Telegram, 1948), to cause capture myopathy (Pennsylvania Game Commission), and to be insufficient at reducing deer populations without the help of periodic culling by researchers at Colorado State and the National Park Service (Raiho, Hooten, Bates, & Hobbs, 2015; Boulanger & Curtis, 2016). Additionally, studies show that it can take 10 years to see significant deer population decreases even with contraceptive rates over 50%, which would be impossible to attain and maintain on the difficult terrain of Catalina. Additionally, canyons and other remote areas that are too dangerous for crews to access would become refugia (safe pockets where deer could gather and avoid treatment) making it impossible to administer contraceptives as needed.(Seagle & Close, 1996). A contraceptive program was successful for the Island's bison because they are herd animals and can be located and treated reliably. Deer, however, are solitary and disperse across difficult terrain, making it impossible to track, capture, and administer contraceptives to the number of animals required, or ensure each receives the correct dose.

3.3 Proposal to Remove Invasive Mule Deer using Ground-based Specialists

3.3.1 Benefits and Examples of Proposed Invasive Mule Deer Removal

The proposed removal of invasive mule deer from Catalina through professional shooters is consistent with successful removal efforts on other islands around the world. The removal of invasive mammals has been shown to greatly benefit biodiversity conservation on island ecosystems. Research examining 1,550 eradication attempts across 998 islands worldwide found that 88% have been successful. Of those efforts, 300 took place on inhabited islands, where the success rate remained high at 82% (Spatz, et al., 2022).

A review of this data has found that 596 populations of 236 native island species benefited from invasive eradications on 181 islands worldwide, and four threatened species had their International Union for the Conservation of Nature Red List extinction-risk categories reduced as a direct result of invasive mammal eradication (Jones, et al., 2016).

3.3.1.1 Channel Islands

In addition to the introduction of invasive ungulates such as goats, pigs, and deer to Catalina, invasive mammals have also been introduced to the other Channel Islands. Across the Channel Islands archipelago, removal of introduced mammals has been a long-standing objective of federal, state, and non-governmental organizations. The California Department of Fish and Wildlife's (CDFW) 2015 State Wildlife Action Plan (SWAP) Appendix H and CDFW's 2025 SWAP Apendix G revision covering Offshore Islands establish an objective to "remove or reduced introduced mainland vertebrates and/or feral livestock that impact native species, specifically endemic species, and ecosystem function" (California Department of Fish and Wildlife, 2015).

Santa Rosa Island (Santa Rosa), within Channel Islands National Park, once had an invasive population of deer like Catalina. The Santa Rosa mule deer population was introduced from the Kaibab National Forest in Arizona (Gustkey, 1986). Santa Rosa also had invasive populations of Roosevelt elk (*Cervus canadensis roosevelti*) and, in the first half of the 19th century, fallow deer (*Dama dama*). Like Catalina, these animals were introduced to Santa Rosa for recreational hunting (French, 2012). In addition to deer and elk, Santa Rosa had introduced populations of pigs, sheep, goats, and cattle. Following the removal of pigs in the early 1990s, the removal of cattle in 1998, and removal of sheep and goats, deer and elk were removed in 2012. These removals have allowed passive recovery of native flora on Santa Rosa as well as the opportunity for active restoration (McEachern, Atwater, Collins, Faulkner, & Richards, 2016).

After all invasive ungulates were removed from Santa Rosa, 36 endemic and/or rare taxa increased in area and 38 endemic and/or rare taxa increased in abundance with corresponding substantial biodiversity gains (Thomson, et al., 2022). Prior to these removal efforts on Santa Rosa, opponents claimed that there was no evidence showing that deer were inhibiting recovery of native plants (Matthews, 2009). The decade since removal of the deer and elk from Santa Rosa has clearly demonstrated the ecosystem recovery that follows the eradication of introduced herbivores (McEachern, Atwater, Collins, Faulkner, & Richards, 2016).

On San Clemente Island (San Clemente) cattle, sheep, goats, pigs, and deer were introduced in the late 1800s to mid-1900s, with goats removed in 1991 and pigs and deer in the 1990s (Keegan, Coblentz, & Winchell, 1994). The removal of these introduced species from San Clemente made possible the recovery of endemic island flora and fauna, with five species including the San Clemente Island lotus (*Acmispon dendroides* var. *traskiae*), San Clemente Island paintbrush (*Castilleja grisea*), San Clemente Island bush-mallow (*Malacothamnus clementinus*), San Clemente Island larkspur (*Delphinium variegatum* ssp. *kinkiense*), and the San Clemente Bell's sparrow (*Artemisiopiza belli clementeae*) declared fully recovered in 2023 and no longer in need of Endangered Species Act protection (U. S. Fish and Wildlife Service, 2023). Like the biodiversity recovery seen on Santa Rosa after the removal of introduced ungulates, the recovery of plant and wildlife species on San Clemente provides an example of the benefits Catalina's ecosystem will experience following the removal of mule deer.

Cattle, sheep, and pigs were similarly introduced to Santa Cruz Island (Santa Cruz). Cattle and sheep were removed following the cessation of ranching operations in the 1980s and 1990s,

while pigs were removed in 2007. After all of the invasive introduced mammals were removed from Santa Cruz, the endemic and endangered Santa Cruz Island fox (*Urocyon littoralis santacruzae*) experienced the fastest recovery and delisting of any mammal in the history of the Endangered Species Act (The Nature Conservancy, 2018) and two formerly threatened and endangered endemic plants, Santa Cruz Island Dudleya (*Dudleya nesiotica*) and island bedstraw (*Galium buxifolium*) (National Park Service, 2023). After the removal of invasive ungulates from Santa Cruz, natural recovery of the Island's ecosystem has included a 23% increase in woody overstory and a transition from invasive annual grasslands and bare ground to woody plants (McEachern, Atwater, Collins, Faulkner, & Richards, 2016).

As seen in Exhibit C, invasive mammal eradications on the other Channel Islands have spanned a range of species and scales. The remaining Channel Islands of San Miguel Island, San Nicolas Island, Anacapa Island, and Santa Barbara Island all experienced introduction of invasive mammals, the majority of which have been successfully removed: San Miguel Island had sheep and donkeys (*Equus africanus asinus*) removed in the 1960s and 1970s respectively; San Nicolas Island had sheep and cats (*Felis catus*) removed in the 1940s and 2000s respectively; Anacapa Island had sheep, cats, rabbits (*Lepus europaeus*), and black rats introduced, with the larger mammals removed in the late 1960s and rats removed in the 2000s; and Santa Barbara Island had sheep and rabbits introduced in the early 1900s with sheep removed in 1926 and rabbits removed in the early 1980s.

Beyond rats remaining on San Miguel, San Clemente, and Catalina islands and cats and house mice (*Mus musculus*) on the latter two, deer and bison on Catalina are the only remaining introduced mammals on the Channel Islands (McEachern, Atwater, Collins, Faulkner, & Richards, 2016).

Island rush-rose (*Crocanthemum greene*i), a federally threatened species, is found on Catalina, Santa Cruz, and Santa Rosa islands, has met recovery criteria on the latter two islands following the removal of invasive mammals. The delisting process for Island rush-rose on Catalina is impeded by the continued threat posed by invasive mule deer (Ken Niessen, personal communication). Other species that are still recovering throughout their range will remain on the Endangered Species List if the threats of deer are still present on Catalina. These include: Catalina Island mountain mahogany (*Cercocarpus traskiae)*, Lyon's pygmydaisy (*Pentachaeta lyonii*), and Santa Cruz Island rockcress (*Sibara filifolia*).

3.3.1.2 Hawaiian Islands

Like Catalina and the other Channel Islands, introduced axis deer (*Axis axis*) on the Hawaiian Islands have proven to be problematic because these island ecosystems evolved without ungulate herbivores. In addition to harmful impacts they cause to native species and ecosystems (Hess S. , 2008), Axis deer have numerous public safety impacts, such as vehicle collisions with deer, disease spread, unregulated hunting, and economic impacts like crop loss, grazing competition, damage to golf courses, and damage to cultural and archeological sites (Anderson, 2003). Axis deer are present on the islands of Maui, Molokai, and Lanai, with the Hawaii Department of Land and Natural Resources attempting to manage populations through

recreational hunting, however this has proven to be ineffective at controlling the populations (Hawaii Department of Land and Natural Resources, 2024). On Maui, axis deer numbers increased from just eight to 7,000 within 30 years (Hess, Muise, & Schipper, 2015). In 2011, there were 12,000 axis deer with 10,000 removed, bringing the population to 2,000, but the numbers increased to 11,000 two years later and increased to 70,000 by 2021 (Hawaii Division of Forestry and Wildlife, 2022) underscoring the need for consistent pressure applied to the population until complete removal is achieved. (Bonenza, 2023).

3.3.1.3 Canada

In North America, islands in British Columbia, Canada have been impacted by introduced deer. Introduced fallow deer and native black-tailed deer are present on Sidney Island within the Gulf Islands National Park Reserve in British Columbia, Canada. Black-tailed deer are also present on other islands in the Salish Sea although some islands do not have deer present; the extirpation of predators has resulted in estimates of a tenfold increase in deer populations due to decreased predation pressure (Payton, 2023). On six islands within Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site, Parks Canada has also initiated an effort to remove Sitka black-tailed deer (Thomson, et al., 2022).

3.3.1.4 Mexico

Removals of introduced mammals have also taken place across the Baja California Islands, with Grupo de Ecología y Conservación de Islas (GECI) a central driver of these efforts in collaboration with the Mexican government. They have completed the removal of 60 invasive mammals starting with goats from Guadalupe Island (Guadelupe) in 2007, which aided significant vegetative recovery (Garcillan, Ezcurra, & Vega, 2008). There are extensive similarities between Guadeloupe and Catalina's cultural and natural histories. Both islands host perennial residents, with a small military garrison, a community of fishermen, and a biological field station located on Guadalupe. Guadalupe is floristically very similar to the Channel Islands, as "24 of its 160 vascular plants are restricted to Guadalupe Island and to one or more islands of the southern [Channel Islands]" (Raven, 1967).

Guadalupe had multiple invasive mammal introductions including cows, feral dogs (*Canis familiaris*), house mice, and feral cats. Feral goats, introduced in the 19th century by whalers, disproportionately impacted the island's flora and fauna through overgrazing, soil erosion and compaction, and over-browsing. All the original plant communities on the island, besides one present on islets off the coast, were highly disturbed by the introduction of goats and "either disappeared, became restricted to a very patchy distribution, or were represented only by isolated individual plants," resulting in the extirpation or extinction of at least 26 plant taxa. A temporary fencing project of critical species allowed for multiple taxa undescribed or unseen in centuries to sprout in the exclosure alongside other underrepresented species. The Guadalupe Island Pine (*Pinus radiata* var*. binata*) flourished. Cupped leaf ceanothus (*Ceanothus perplexans*) was discovered for the first time since the late 1800s (Keitt, Junak, Luna-Mendoza, & Aguirre, 2005). The ecosystem of Guadelupe proved its resilience through passive restoration after goats were removed by 2007. Formerly extinct and eliminated species were rediscovered.

New plant records were established, including an undescribed species. The endemic pine seedlings increased to several thousand individuals after only 220 adult pines were recorded on the island in 2001. Heavily impacted maritime desert scrub recovered from almost 0% native vegetation coverage to 52% (Luna-Mendoza, et al., 2019).

Eradication efforts were also conducted on Socorro Island from 2009 to 2012 to remove 1,762 feral sheep (Ortiz-Alcaraz, Aguirre-Munoz, Mendez-Sanchez, & Ortega-Rubio, 2016). A third of the Island's habitat was destroyed by feral sheep putting many endemic species at risk. Within one year of the eradication, 11% of the disturbed area showed measurable recovery with the forest habitat having the greatest recovery followed by mixed scrub and then eroded surface (Ortiz-Alcaraz, et al., 2019).

3.3.1.5 Australia and New Zealand

Ungulate control efforts in Australia and New Zealand also parallel the difficulties on Catalina, as both these countries' ecosystems evolved without these animals. Australia is dealing with the environmental challenge posed by feral deer, whose invasion across the continent threatens natural ecosystems. Without effective management and intervention, these invasive species are projected to invade most of Australia (Hampton & Davis, 2020). In response, the Government of South Australia, in collaboration with the National Feral Deer Working Group, has developed the National Feral Deer Action Plan. This comprehensive strategy aims to mitigate the adverse effects of feral deer on agriculture, communities, and the environment through targeted culling by highly skilled shooters. Despite being classified as game animals in some Australian jurisdictions, conventional recreational hunting has proven insufficient in curbing the deer population's growth (Government of South Australia, 2023; Shaw & Willacy, 2021).

Between 1861 and 1919, New Zealand witnessed the introduction of over 250 red deer (*Cervus elaphus*) for sport hunting, along with various other deer species such as wapiti, fallow deer, Sitka black-tailed deer, sambar deer, rusa deer, and whitetail deer (New Zealand Department of Conservation, 2024). Released into environments devoid of natural predators and abundant in resources, these deer species experienced rapid population growth, in part due to initial legal protections against hunting. This led to significant ecological impacts, as deer began over-browsing native undergrowth and young trees in forests. The deer removed the native plants that played a crucial role in reducing rainfall runoff, which consequently increased erosion, and hindered the forests' natural regeneration capabilities (Mark & Baylis, 1982; Monks, Lee, Burrows, McNutt, & Edge, 2005).

3.3.1.6 Galápagos Islands

Project Isabela on the Galápagos Islands in Ecuador was an ambitious effort to eradicate several invasive ungulates from the islands, which was initiated due to the environmental damage caused by feral goats on the ecosystem of Isabela Island. The presence of goats led to extensive ecological damage, particularly affecting the Galápagos giant tortoises (*Chelonoidis niger*), by destroying the forested areas that provided essential shade and water sources during the dry

season (Galápagos Conservancy). The goats not only decimated the habitat of the tortoises but also adversely impacted other native and endemic species across the island.

In response, the Charles Darwin Foundation and the Galapagos National Park Directorate convened an international workshop in 1997 to explore the feasibility of eradicating the invasive goat population. This led to the launch of Project Isabela, the most extensive ecosystem restoration initiative in a protected area globally, aimed at eradicating all large, introduced mammals from key islands to restore natural ecological balance. Utilizing advanced techniques, the effort achieved remarkable success. By 2006, the goat populations on Pinta, Santiago, and northern Isabela were eradicated, leading to a significant recovery of the native vegetation and resurgence of endemic species, including the Galápagos rail (*Laterallus spilonota*) which increased in abundance after the removal of goats (Galápagos Conservancy, 2025).

3.3.2 Public Safety of Deer Removal Proposal

There is minimal public safety risk of using shooting to complete removal efforts on an inhabited island. This has been proven by several successful removal efforts that used this method without incident. Professional shooting was used successfully and safely on several inhabited islands, including but not limited to: Catalina Island for the goat and pig removal, Lord Howe Island (Parkes, Macdonald, & Leaman, 2002), Dirk Hartog Island (Heriot, Asher, Williams, & Moro, 2019), and Kangaroo Island (Cox, et al., 2023) in Australia; Sydney Island and Haida Gwaii in Canada; Guadalupe Island (Luna-Mendoza, et al., 2019) in Mexico; the Galápagos Islands of Floreana and Isabela (Ruiz-Ballesteros & del Campo Tejedor, 2022) in Ecuador; Trinidade Island (da Silva & Alves, 2011) in Brazil; Maui (Bonenza, 2023) in the Hawaiian Islands. Even in areas of the mainland United States, professional shooting has been proven to be a safe and effective tool, such as at Point Reyes National Seashore, where the National Park Service used this methodology to manage populations of introduced fallow deer and axis deer (National Park Service, 2024).

There are no published cases in the global island eradication literature where a member of the public was injured by eradication operations. The primary documented risks to people in these projects are those shared with many other remote-field activities like boat and helicopter transport, rough terrain, and weather. Recreational hunting, however, does pose a risk. Estimates from hunting-safety organizations suggest that several hundred to around 1,000 hunting-related injuries occur each year in the United States, with a smaller number of fatal accidents (USA, 2025). Because of differences in reporting and definitions, the exact annual count is uncertain. On Catalina last year, there were no hunting injuries but eight reported incidents involving recreational hunters being unsafe. If the Conservancy proceeds with the removal of mule deer by specialists, the public would be far safer than under a continued recreational hunting season.

3.3.3 Humaneness of Invasive Mule Deer Removal Proposal

The Proposal to remove nonnative mule deer through professional shooters was made following the international consensus principles for ethical wildlife control laid out by experts

from the British Columbia SPCA, Centre for Compassionate Conservation, Animal Welfare Science and Bioethics Centre, Detroit Zoological Society, Canadian Federation of Humane Societies, Wildlife Protection Department of the Humane Society of the United States, RSPCA UK Wildlife Department, and RSPCA Australia (Dubois, et al., 2017; Cox, et al., 2023).The humaneness of shooting over methods that require capture is reiterated in the report "A model for assessing the relative humaneness of pest animal control methods." This report found shooting to have an equal or better welfare rating prior to death than trapping methods and notes that "the humaneness of trapping is highly dependent on how the subsequent stages (i.e. holding in the yards, drafting, shooting or transport) are conducted (Cox, et al., 2023). The cumulative effects of these stages will compound welfare impact," (Sharp & Saunders, 2011). Based on these findings, alternatives such as translocation and sterilization that require prolonged or repeated trapping would earn an overall welfare rating that is worse than shooting. Additionally, the American Veterinary Medical Association lists gunshot as "acceptable with conditions for euthanasia of free-ranging, captured, or confined wildlife" in their guidelines for the euthanasia of animals (American Veterinary Medical Association, 2020).

The British Columbia SPCA has stated regarding the Sydney Island Ecological Restoration Project, which is utilizing aerial hunting to remove deer, that:

> The BC SPCA is not opposed to the eradication program given it is scientifically sound, supports reconciliation, will be conducted humanely and ethically, and will result in less animal suffering in the long term. The continuous cycle of recreational hunting and culls of fallow deer on Sidney Island over the past 40 years has not restored the island's biodiversity to benefit other species or ecosystem recovery. The current proposal intends to end this ineffective killing cycle. (BC SPCA, 2023)

Finally, the American Association of Wildlife Veterinarians has written a letter, included in Exhibit D, stating their support for the proposed method of deer removal from Catalina.

3.3.4. Safety and Ubiquitousness of Night Shooting

The Conservancy's proposed removal of invasive deer will include night ground-based shooting conducted by trained professionals in the interior of Catalina Island. This method is widely used across the United States for deer depopulation and has an extensive record of safe and effective implementation in both rural and densely populated environments (DeNicola & Williams, Managing White-tailed Deer: Setting the Record Straight, 2010; DeNicola & DeNicola, Ovariectomy As a Management Technique for Suburban Deer Populations, 2021; Maryland Department of Natural Resources, 2020; Maryland–National Capital Park and Planning Commission (Montgomery Parks), 2024). Night shooting is a standard component of professional deer reduction programs as it aligns with natural behavior of deer, which are most active during crepuscular and nocturnal periods (Beier & McCullough, 1990). Conducting operations at night allows for high detection rates, precise targeting, and minimal disruption to residents and visitors, and is widely recognized in wildlife management literature as an effective tool for achieving population reduction targets where recreational hunting is insufficient (DeNicola A. J., 2010; Kilpatrick, 1999). Night vision equipment is used to enhance safety of the operation by positively identifying the mule deer before engaging.

Throughout the country night shooting is routinely authorized and implemented by state and federal wildlife agencies, including the Maryland Department of Natural Resources and the Pennsylvania Game Commission, under permits that allow qualified professionals to conduct removal operations in sensitive areas (Maryland Department of Natural Resources, 2020; Pennsylvania Game Commission, 2015). Many municipalities conduct annual or recurring night shooting operations to control overabundant deer populations. Examples include Fairfax County, Virginia, which carries out annual wildlife-department–led sharpshooting operations in closed parks during evening and nighttime hours (Fairfax County ,Virginia, 2025); the Vassar College Preserve in Poughkeepsie, New York, where deer culls are conducted exclusively at night when the preserve is closed to the public (Vassar College Preserve, 2025); and the City of Wildwood, Missouri, which authorizes professional contractors to remove deer using suppressed firearms and night-vision equipment as part of its suburban deer management program (City of Wildwood, 2025). These programs consistently report high efficiency and no public safety incidents when operations are conducted by qualified personnel.

The safety of night shooting is supported by decades of documented practice. Professionals use restricted access zones, designated firing lanes, controlled engagement distances, and ammunition selected to prevent overpenetration. Thermal and infrared imagery are also used to positively identify targets and observe the surrounding terrain. These tools increase accuracy and reduce the likelihood of wounding. Evaluations of ground-based ungulate control methods have found that professional night shooting achieves rapid incapacitation, precise shot placement, and minimal risk to the public when proper protocols are followed (Williams, 2013; Sharp & Saunders, 2011).

Night shooting has been used safely in communities with population densities far higher than Catalina Island, including residential neighborhoods and institutional campuses where professional sharpshooting programs have operated for decades without public safety incidents (Kilpatrick, 1999). In comparison, the Conservancy's operations will occur in remote interior zones during nighttime periods where public presence is extremely limited or nonexistent. The combination of experienced sharpshooters, controlled access areas, and advanced thermal detection technologies enable a high level of operational control and safety, consistent with established best practices for ground-based ungulate removal (Sharp & Saunders, 2011).

Furthermore, island eradications require methods that ensure complete detection and removal of remaining animals and night shooting is specifically suited to these conditions. Research on Catalina has shown that the rugged terrain, dense vegetation, and limited road access allow ungulates to evade daytime detection making nocturnal operations essential for locating all individuals (Krajick, 2005). Studies of island based ungulate control programs, including work on feral pigs, show that night shooting paired with thermal imaging provides a critical advantage in identifying animals that would otherwise remain hidden in complex island landscapes (McCann, 2004). Additional island case studies, including the removal of feral pigs on Quail Island in New Zealand, demonstrate that targeted nocturnal operations were critical to achieving full eradication in complex terrain (Bolden & Johnston, 2020). As successful island eradications depend on removing every animal to prevent rapid population recovery (Morrison et al., 2007),

the elevated detection rates and low disturbance nature of night operations make them an established best practice for island ecosystems while also supporting a high degree of operational safety (Sharp T. , 2013). Night shooting in association with trapping was conducted on Catalina for feral pig removal without incident (Peter Schuyler personal communication).

The importance of night operations for locating remnant individuals in island settings is further illustrated by the following expert statement from Gregg Howald, an island restoration practitioner with more than 19 years of experience and more than 40 island eradication projects across North and South America:

"remnant deer that will not have been removed using earlier/daytime techniques, can become adept at avoiding certain techniques, become more active under darkness (night) to avoid visual detection, and will move toward more dense or rugged island terrain where they will be less likely detected visually. It is these individuals that are of the greatest concern from an operational planning perspective - the ability to detect and remove these individuals will be imperative to the ultimate success of the eradication. Night hunting, utilizing tools such as spotlighting and/or advanced thermal and night vision technologies, allows professional marksmen to more likely detect and safely discharge a firearm to remove deer. This specialized phase is crucial as even a handful of remaining animals can rapidly re-establish the invasive population, negating years of costly effort"

This point is further reiterated by Chad Hanson, currently serving as Island Conservation's Deputy Vice President, an island restoration practitioner with over 20 years of experience including a predominant role in the world's largest goat removal on Santiago Island, Galápagos:

" Utilizing a night hunting approach capitalizes on natural deer behavior as deer tend to feed more actively at night and spend more time in open areas where they can be more readily detected. Thermal imaging produces an immediate indication where temperature fluctuations exist and traditional efforts with spotlights as well as infrared illuminators coupled with night vision are capable of exposing the reflective tapetum lucidum layer in a deer's eyes thus enhancing the opportunity to detect an animal which are generally cryptic during daylight hours due to their behavior and pelage color. Systematic sweeps with these technologies can reveal body heat or eye shine across large tracks of habitat and at considerable distances. This action helps field practitioners rapidly locate animals at a landscape scale and prepare for their removal in an undisturbed fashion which supports controlled and precise shot placement increasing the humanness of the removal action – an effort that also reduces disturbance to the public and allows carcasses to be removed discreetly, minimizing conflict and impacts to those not familiar with wildlife management efforts.

Furthermore, deer are generally less wary at night and less likely to anticipate human activity. As a result, nighttime operations aid hunters in carefully planning removal efforts to avoid educating individuals who become costly to remove at the end of a project. This aligns with a core principle of eradication where removal techniques selected should be sequenced strategically to maximize efficiency and not jeopardize efficacy of current and subsequent methods. Hunting at night with specialized tools adheres to this as the risk of an animal

escaping and becoming wary of removal techniques is minimized. This should be a key concern if removal tools are limited as a common risk to eradication success is running out of tools or techniques that effectively detect and remove animals more quickly than they can repopulate. As a result, night operations, conducted by disciplined practitioners, limit animals' ability to adapt behaviorally and deliver more efficient and cost-effective projects."

In California, there are specific cases where night shooting was permitted for take of pigs, which requires a special use depredation permit (Management, 2025; CDFW, 2025). In California, Fish and Game Code 4181.5 and 14 CCR 400 regulate deer depredation permits. White Buffalo has utilized night shooting in the Point Reyes fallow and axis deer eradication project, the techniques used were very similar to the Conservancy's proposed plan. A truck was set up with the shooting rack and used a driver, spotter, and shooter.

The peer-reviewed literature and decades of global eradication practice demonstrate that night shooting is a standard, widely used, and often essential method in ungulate eradications on islands, including deer. Night operations are incorporated specifically because they maximize target detectability, reduce disturbance, improve humane outcomes, and decrease safety risks to personnel and the public by limiting activity to controlled-access nighttime conditions. Professionally led night shooting operations maintain among the lowest accident rates of any remote-field wildlife management activity.

3.3.5. Use of Detection Dogs on Catalina Island and Other Islands

The next stage of deer removal will utilize trained detection dogs to assist in locating remaining deer that retreat into dense vegetation and rugged interior terrain as numbers decline and visual detection becomes less successful. This approach is consistent with established practice on other Channel Islands, where detection dogs have been used to effectively locate invasive mammals that could not be found through thermal imaging, night shooting, or ground-based surveys once populations reached very low densities.

During the feral pig removal on Catalina Island, dog teams were deployed to locate pigs that had avoided earlier removal efforts and moved into cover where they could not be detected through aerial or ground-based searches. Their use allowed field crews to find individuals that would have otherwise remained undetected (Garcelon, 2005). On Santa Cruz Island, detection dogs also played an important role in locating pigs that had retreated into remote drainages and dense vegetation once the broader population had been reduced (Ramsey, Parkes, & Morrison, 2009; Parkes, et al., 2010). Detection dogs were considered essential as they tracked the last remnant feral pigs hiding in sea caves that were considered to be inaccessible to pigs (Ramsey, Parkes, & Morrison, 2009).

Detection dogs were similarly employed on Santa Rosa Island for feral pig removal, locating remaining animals to reach full eradication (Lombardo & Faulkner, 2000). Detection dog use has also been documented in ungulate management on Santa Cruz Island where live capture and removal of feral sheep also required locating animals in difficult terrain and reduced densities (Faulkner, 2011). In addition to these ungulate removal projects, trained dogs were used in the removal of feral cats on San Nicolas Island, enabling crews to detect remaining cats

(Hanson, Will, Bonham, & Keitt, 2009), further demonstrating the role of trained dogs in complex island environments.

These Channel Islands case studies align with broader invasive species eradication practice. International experience has shown that finding the last remaining individuals of an invasive mammal population is often the most challenging element of an eradication and that detection dogs reduce likelihood of undetected survivors that would allow a population to reestablish (Howald, et al., 2007). Detection dogs have been so effective in finding "a needle in a haystack", that they have also been employed to detect Argentine ants and island spotted skunk scat on Santa Cruz Island (Christina Boser and Lara Brenner, personal communication respectively).

The operational role of detection dogs in the final stages of eradication is further described by Gregg Howald, an internationally experienced island restoration practitioner with more than 19 years of involvement in invasive species removal programs:

"The subsequent or concurrent use of detection dogs is necessary to locate any ultra-wary, low-density survivors and confirm eradication success. Dogs, with their unparalleled sense of smell, are the most reliable tool for overcoming the inherent challenges of low-density detection, such as finding a single animal in a vast, complex landscape otherwise inaccessible to people. By running detection dogs under the control of trained marksmen, in a systematic manner, we can detect and encourage deer to move out of high cover into more open areas to be safely and humanely dispatched by trained marksmen. The use of detection dogs that 'sweep' blocks of the island are essential to confirming eradication success."

The role and importance of detection dogs is further reiterated by Chad Hanson:

"Specially trained detection/hunting dogs also serve an essential complementary role in these projects. Their sensitive olfactory capabilities allow them to detect residual scent traces long after their target was present at the site. Skilled dogs can discriminate between individual scent signatures, follow faint trails, and signal to handlers whether deer remain in an area supporting near real-time planning and decision making. In an eradication context, this function is invaluable because it provides a detection mechanism independent of visual or technological tools and importantly, one that deer cannot avoid through altered behavior. As a result, dogs serve in a unique role by supporting removal efforts as well as building confidence towards eradication confirmation, ensuring that no animals persist undetected.

On projects like Catalina Island where the most effective removal technique of aerial hunting has been rejected, it becomes essential that all viable ground-based tools and technologies remain available. The combined use of thermal imaging, night vision, spotlights, and trained dogs to support systematic, intensive, and disciplined hunting efforts ensures that removal rates stay ahead of recruitment. Strategically sequencing and leveraging every effective method not only improves efficiency but offers confidence that eradication is feasible."

The use of detection dogs in the Project follows the established and successful model employed on Catalina, Santa Cruz, Santa Rosa, and San Nicolas islands and reflects best practices for

completing invasive mammal eradications in large topographically complex island environments.

3.3.6. Credentials of White Buffalo Inc.

The Conservancy plans to work with White Buffalo Inc. (White Buffalo) to complete the proposed removal of the deer population from Catalina. White Buffalo is a 501(c)(3) nonprofit organization that was founded in 1996 by Dr. Anthony DeNicola and is dedicated to the conservation of native species and ecosystems. White Buffalo specializes in the use of remote immobilization equipment and have trained many professionals in this discipline including the Humane Society of the United States, professionals at Pneudart, Inc., and a NYPD special operations unit, along with graduate students from University of Georgia, University of Connecticut, Yale University, and Rutgers University. Dr. DeNicola has also provided training for the Wildlife Society summer field technique training group. White Buffalo has darted well over 5,000 free-ranging deer, making it the most experienced organization in the country at this method of capture. White Buffalo also works with local veterinarians, has veterinarians on staff, and/or uses veterinary partners if animals need to be anesthetized.

White Buffalo has conducted over 100 deer population reduction efforts across the United States. White Buffalo's methods are humane and address concerns for animal welfare by following the American Veterinary Medical Association's stringent guidelines for humane depopulation of animals (American Veterinary Medical Association, 2020). White Buffalo has also spent over 20 years committed to improving both technology and techniques to increase safety, humaneness, and efficiency for the management of white-tailed deer. As a result of their extensive testing, they have found that during hunting no bullet fragments with significant size or inertia exit the target animal, therefore ensuring public safety. They have extensive experience in both removing and capturing deer in a variety of human-occupied environments without incident to the public. White Buffalo has experience selecting safe shooting sites that satisfy the requirements of regulatory officials and property owners.

White Buffalo is committed to sharing their research findings and expertise with students, colleagues, and the public. White Buffalo's founder, Dr. DeNicola has extensively published (DeNicola & DeNicola, 2021; DeNicola, Kesler, & Swihart, 1997; Anthony, 2019; Gagnier, Laurion, & DeNicola, 2020; O'Donnell & DeNicola, 2006; Stafford, DeNicola, & Magnarelli, 1996), and has presented at a variety of conferences, seminars, and training programs. White Buffalo's work on wildlife capture and euthanasia along with fertility control and hunt management programs has led to over 70 peer reviewed publications. DeNicola has trained biologists in capture and humane euthanasia techniques and shared his field knowledge broadly with students. In addition, he has consulted with numerous communities and landowners, helping them understand how to best address the problems of overabundant deer. His research has contributed to management of Chronic Wasting Disease (CWD) (Gagnier, Laurion, & DeNicola, 2020), Lyme disease transmission (Stafford, DeNicola, & Magnarelli, 1996), dosing of birth control in white-tailed deer (DeNicola, Kesler, & Swihart, 1997), and the humanness of gunshot targeting (Anthony, 2019). White Buffalo has extensive experience

working in a populated areas including single-family residential communities in Ann Arbor, Michigan, the Clifton neighborhood of Cincinnati, Ohio, the suburbs of Fairfax City, Virginia, the National Institute of Health office complex in Bethesda, Maryland, the Village of Cayuga Heights, New York, and the Villages Gold and Country Club in San Jose, California (DeNicola & DeNicola, 2021).

In addition to reviewing White Buffalo's extensive experience, provided in Exhibit E, the Conservancy has consulted with several partners and individuals to determine whether White Buffalo would be the correct organization to address the deer problem on Catalina. White Buffalo has worked on several major successful invasive animal removal programs in California, including on other Channel Islands. These efforts include the removal of deer and elk from Santa Rosa Island, removal of fallow and axis deer from Point Reyes National Seashore, and removal of turkeys and pigs from Santa Cruz Island. Each of these successful efforts used similar methodologies to what is proposed on Catalina, including ground shooting and aerial support techniques. The Conservancy has received testimonials, which are included in Exhibit F, from other organizations that led these invasive animal removal efforts, which commended White Buffalo's work and methods and recommended contracting with White Buffalo for the Catalina Island Restoration Project.

Robyn Shea, the Lead Research Station Specialist at the Santa Rosa Island Research Station, stated:

> The use of wildlife biologists as professional shooters has been proven around the globe to be the most humane and most effective way to remove invasive ungulates from landscapes. The company being hired for the removal on Catalina, is the same company that did the removal of deer and elk on Santa Rosa Island. I had the privilege of working alongside them, and no one can do it better. They are trained wildlife biologists; they are not mercenaries as many are depicting them to be. Utilizing helicopters as a support tool is the surest way to remove the animals in the most efficient and most humane way possible, which will ultimately cause the least disturbance for residents and visitors. (Shea, 2023)

Morgan Ball, the Executive Director of Wildlands Conservation Science (WCS), and Katrina Olthof, the Conservation Program Manager of WCS, also worked with White Buffalo on Santa Rosa Island, describing how they:

> … teamed with White Buffalo, Inc. to remove all introduced Kaibab mule deer and Roosevelt elk from Santa Rosa Island in 2011. WCS has experienced first-hand the solemn professionalism and level-headedness that these professional shooters bring to their work. (Ball & Olthof, 2023)

Scott Morrison, the Director of Conservation for The Nature Conservancy in California, describes the

> An exceptionally qualified team hunting can be a highly effective strategy for reducing risk and increasing efficiency of an removal effort, and enabling a conservation manager to also achieve its animal welfare objectives in the effort.
> (Morrison, 2023)

Dr. DeNicola and his team at White Buffalo have a well-established track record of success as well as an outstanding reputation within the field of conservation. The Conservancy is confident that the methodology recommended by White Buffalo will be efficient, humane, and safe as it has been proven to be in projects they have previously completed.

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Exhibit A: Hunting Tag and Harvest Data, 1982-2024

YEAR	TAGS ISSUED	TOTAL HARVEST	PERCENT TAG SUCCESS
1982	150	74	49%
1983	150	82	55%
1984	70	45	64%
1985	300	146	49%
1986	300	119	40%
1987	251	79	31%
1988	UNKNOWN	106	UNKNOWN
1989	300	7	2%
1990	300	7	2%
1991	300	21	7%
1992	179	100	56%
1993	289	67	23%
1994	249	84	34%
1995	241	81	34%
1996	108	21	19%
1997	NA	15	NA
1998	141	79	56%
1999	239	101	42%
2000	184	100	54%
2001	0	0	NA
2002	98	77	79%
2003	271	214	79%
2004	220	165	75%
2005	240	166	69%
2006	263	235	89%
2007	547	402	73%
2008	372	254	68%
2009	286	216	76%
2010	271	180	66%
2011	358	282	79%
2012	389	310	80%
2013	400	309	77%
2014	340	225	66%
2015	321	217	68%
2016	344	244	71%
2017	320	207	65%
2018	340	223	66%

2019	318	181	57%
2020	339	221	65%
2021	385	245	64%
2022	437	207	47%
2023	500	320	64%
2024	754	379	50%
AVERAGE	**289**	**158**	**55%**

Exhibit B: Table of Rare Plant Taxa on Catalina Island

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	STATE RANK	GLOBAL RANK	CALIFORNIA RARE PLANT RANK	CATALINA ISLAND ENDEMIC
Abronia maritima	Red sand verbena			S3?	G4	4.2	
Aphanisma blitoides	Aphanisma			S2	G3G4	1B.2	
Arctostaphylos catalinae	Santa Catalina Island manzanita			S2?	G2?	1B.2	X
Atriplex coulteri	Coulter's saltbush			S1S2	G3	1B.2	
Atriplex pacifica	South Coast saltscale			S2	G4	1B.2	
Atriplex serenana var. *davidsonii*	Davidson's saltscale			S1	G5T1	1B.2	
Bergerocactus emoryi	Golden-spined cereus			S2	G2G3	2B.2	
Calochortus catalinae	Catalina mariposa lily			S3S4	G3G4	4.2	
Calystegia macrostegia ssp. *macrostegia*	Island morning-glory					CBR	
Ceanothus arboreus	Feltleaf ceanothus					CBR	
Ceanothus megacarpus var. *insularis*	Island ceanothus			S4	G5T4	4.3	
Centromadia parryi ssp. *australis*	Southern tarplant			S2	G3T2	1B.1	
Cercocarpus betuloides var. *blancheae*	Island mountain-mahogany			S4	G5T4	4.3	
Cercocarpus traskiae	Catalina Island mountain mahogany	FE	CE	S1	G1	1B.1	X

Cistanthe maritima	Seaside cistanthe			S3	G3G4	4.2	
Constancea nevinii	Nevin's wooly sunflower			S3	G3	1B.3	
Convolvulus simulans	Small-flowered morning glory			S4	G4	4.2	
Crocanthemum greenei	Island rush-rose	FT		S3	G3	1B.2	
Crossosoma californicum	Catalina crossosoma			S3	G3	1B.2	
Deinandra clementina	Island tarplant			S4	G4	4.3	
Dendromecon harfordii var. *rhamnoides*	South island bush-poppy			S1	G4T1Q	3.1	
Dichondra occidentalis	Western dichondra			S3S4	G3G4	4.2	
Diplacus traskiae	Santa Catalina Island monkeyflower			SX	GX	1A	X
Dissanthelium californicum	Catalina grass			S1	G2	1B.2	
Dithyrea maritima	Beach spectaclepod		CT	S1	G1	1B.1	
Dudleya greenei	Greene's dudleya			S3	G3	4.2	
Dudleya virens ssp. *hassei*	Catalina Island dudleya			S2	G3?T2	1B.2	X
Dudleya virens ssp. *insularis*	Island green dudleya			S3	G3?T3	1B.2	
Dudleya virens ssp. *virens*	Bright green dudleya			S2	G3?T2	1B.2	
Eriodictyon traskiae ssp. *traskiae*	Trask's yerba santa					CBR	

Eriogonum giganteum var. *giganteum*	Santa Catalina Island buckwheat			S3	G3T3	4.3	X
Eriogonum grande var. *grande*	Island buckwheat			S4	G4T4	4.2	
Eschscholzia ramosa	Island poppy			S4	G4	4.3	
Euphorbia misera	Cliff spurge			S2	G5	2B.2	
Galium catalinense ssp. *catalinense*	Santa Catalina Island bedstraw			S2	G4T2	1B.3	X
Galium nuttallii ssp. *insulare*	Nuttall's island bedstraw			S4	G5?T4	4.3	
Gambelia speciosa	Showy island snapdragon			S3	G3	1B.2	
Gilia nevinii	Nevin's gilia			S4	G4	4.3	
Harpagonella palmeri	Palmer's grapplingho ok			S3	G4	4.2	
Hordeum intercedens	Vernal barley			S3S4	G3G4	3.2	
Isocoma menziesii var. *decumbens*	Decumbent goldenbush			S2	G3G5T2T3	1B.2	
Jepsonia malvifolia	Island jepsonia			S4	G4	4.2	
Lavatera assurgentiflora ssp. *glabra*	Southern island mallow			S1	G1T1	1B.1	
Lepechinia fragrans	Fragrant pitcher sage			S3	G3	4.2	
Lepidium virginicum var. *robinsonii*	Robinson's pepper-grass			S3	G5T3	4.3	
Lonicera subspicata var. *subspicata*	Santa Barbara honeysuckle			S2?	G5T2?	1B.2	
Lotus dendroideus	Island deerweed			S3	G4T3	4.2	

var. *dendroideus*							
Lycium brevipes var. *hassei*	Santa Catalina Island desert-thorn			S1	G5T1Q	3.1	
Lycium californicum	California box-thorn			S4	G4	4.2	
Lyonothamnus floribundus ssp. *floribundus*	Santa Catalina Island ironwood			S2	G3T2	1B.2	X
Malacothamnus fasciculatus var. *catalinensis*	Santa Catalina Island bush-mallow			S2	G4T2Q	4.2	X
Microseris douglasii ssp. *platycarpha*	Small-flowered microseris			S4	G4T4	4.2	
Nemacaulis denudata var. *denudata*	Coast woolly-heads			S2	G3G4T2	1B.2	
Orobanche parishii ssp. *brachylobum*	Short-lobed broomrape			S3	G4?T4	4.2	
Pentachaeta lyonii	Lyon's pentachaeta	FE	CE	S1	G1	1B.1	
Piperia cooperi	Chaparral rein orchid			S3S4	G3G4	4.2	
Quercus engelmannii	Engelmann oak			S3	G3	4.2	
Quercus pacifica	Island scrub oak			S4	G4	4.2	
Quercus tomentella	Island oak			S3S4	G3G4	4.2	
Quercus x macdonaldii	Macdonald oak					CBR	
Rhamnus pirifolia	Island redberry			S4	G4	4.2	
Ribes viburnifolium	Santa Catalina Island currant			S2?	G2?	1B.2	

Scrophularia villosa	Santa Catalina figwort			S3	G3	1B.2	
Senecio aphanactis	Chaparral ragwort			S2	G3	2B.2	
Senecio lyonii	Island senecio					CBR	
Sibara filifolia	Santa Cruz Island rock cress	FE		S2	G2	1B.1	
Solanum wallacei	Wallace's nightshade			S2	G3Q	1B.1	
Suaeda taxifolia	Wooly seablite			S4	G4	4.2	
Trifolium gracilentum var. *palmeri*	Southern island clover			S4	G4	4.2	

Exhibit C: Timeline of Introductions and Eradications on the Channel Islands

Species	San Miguel	Santa Rosa	Santa Cruz	Anacapa	Santa Barbara	San Nicolas	Santa Catalina	San Clemente
Rabbits (*Lagomorpha*)								
European rabbit					1942–1981		2000–present (pets)	
European hare				1930s–mid-1960s	1918–1930s			
Rodents (*Rodentia*)								
Western harvest mouse								1930s–present?
California vole								1930s–present?
House mouse							Early 1900s–present	Post-1943–present
Black rat	Early 1900s–present			1853?–2002			Early 1900s–present	Post-1943–present
Norway rat							1939–present?	
Carnivores (*Carnivora*)								
Dogs								
Domestic dog	1884–1940s	1888-1993	1880s–1980			1853–1857, early 1940s	Late 1800s–present (pets)	1870s–1940s
Cats								
Feral cat	1884–early 1940s	Late 1930s	Early 1920s–1939	Late 1920s–late 1940s	Pre-1863–1978	1901–2010	Pre-1932–present	1863–present
Herbivores: Odd-toed ungulates (*Perissodactyla*)								
Horse	1851–1948	1844–present	1839–2009		1915–1919	1857–1943	1863–present	1860s–1958, 1972–1977
Mule/burro/donkey	Early 1950s–1976	1880s			1915–1922	1900s–early 1940s	1886–1903?	1913–1930s

Species	San Miguel	Santa Rosa	Santa Cruz	Anacapa	Santa Barbara	San Nicolas	Santa Catalina	San Clemente
Herbivores: Even-toed ungulates (*Artiodactyla*)								
Pigs								
Feral pig	1851–1897?	1853–1993	1852–2006				1932–2004	1951–1990
Deer								
Fallow deer			1890–1949					
Mule deer		1880–2015					1928–present	1955, 1962–1990
Elk		1879–2011						
Cattle, Sheep, Goats								
American bison							1924–present	
Domestic cattle	1851–1917?	1844–1998	1830–1999			1856–1870, late 1930s	1854–1970s	1890s–1934
Blackbuck							1972–2011	
Goat	Late 1880s–1890?	1883–early 1900s	Late 1880s, 1919–1920				Pre-1827–2005	1875–1993
European mouflon sheep	Pre-1850–early 1970s	1844–early 1960s	1853–2001	1869–1937	Pre-1863–1926, 1942–1946	1856–1949	1850s–mid-1920s	1853–1941
Barbary sheep							1973–late 1970s	

Table adapted from *Ecosystems of California* (Mooney & Zavaleta, 2016).

Exhibit D: Letters of Support

1. ***American Association of Wildlife Veterinarians***
2. ***American Bird Conservancy***
3. ***California Botanic Garden***
4. ***California Invasive Plant Council***
5. ***Center for Biological Diversity***
6. ***California Institute of Environmental Studies***
7. ***California Native Plant Society***
8. ***Endangered Habitats League***
9. ***Friends of the LA River***
10. ***Gabrielino Tongva***
11. ***Global Conservation Consortium – Oak***
12. ***Grupo de Ecologia y Conservacion de Islas***
13. ***Hills For Everyone***
14. ***Keri Dearborn***
15. ***Irvine Ranch Conservancy***
16. ***Island Conservation***
17. ***Dr. William Hayes, Professor of Biology, Loma Linda University***
18. ***United States Department of Interior – National Park Service***
19. ***Santa Barabara Botanic Garden***
20. ***Robyn Shea, Lead Research Specialist, Santa Rosa Island Research Station***
21. ***Roger Young, Catalina Island Resident***
22. ***The Nature Conservancy***
23. ***Dr. Dirk H Van Vuren, Professor of Wildlife Biology, UC Davis***
24. ***T. Winston Vickers, DVM, MPVM, Associate Research Veterinarian – UC Davis Wildlife***
25. ***Dr. Travis Longcore, Adjunct Professor, UCLA***
26. ***Dr. Lisa Stratton, Director of Ecosystem Management, UC Santa Barbara***
27. ***United States Department of Interior – U.S. Fish and Wildlife Service***
28. ***Wildlands Conservation Science***
29. ***Dr. Katherine Pease***
30. ***Conservation Corps of Long Beach***
31. ***Huttopia***
32. ***LA Conservation Corps (The Corps)***
33. ***Los Angeles Neighborhood Land Trust***
34. ***Outward Bound Adventures***
35. ***Laura Ahkiam, Parent, LBUSD***
36. ***Terry Grill, Former Chair Board of Directors Catalina Island Conservancy***
37. ***Anthony F. Michaels, Catalina Island Conservancy Board***
38. ***San Gabriel Mountains Regional Conservancy***
39. ***Chair of the Benefactors & Chair of the Board of Directors, Catalina Island Conservancy***
40. ***Catalina Island Company***
41. ***Southern California Edison***
42. ***Dr. Geraldine Knatz, Professor of the Practice of Policy and Engineering, USC***
43. ***Patricia McCormick, Catalina Island Resident***
44. ***National Parks Conservation Association (NPCA)***
45. ***Coastal Corridor Alliance***

46. Victoria Dean, Catalina Island Conservancy Board
47. Josh Lowenthal, Assemblymember, 69th District
48. Steven L. Monfort, DVM, PhD, Executive Director, UC Natural Reserve System
49. Adam B. Schiff, Member of Congress
50. The South Los Angeles Transit Empowerment Zone (SLATE-Z)
51. Ventura Land Trust
52. Orange County Coastkeeper
53. Jessica Rodriguez, Catalina Island Business Owner, Newport Landing Sportfishing & Whale Watching
54. Maureen H. Ramer, Vice-Chair Catalina Island Conservancy Board of Directors
55. Blanny Avalon Hagenah, Part-Time Catalina Island Resident
56. Catalina Adventure Tours
57. Ken Owen, Executive Director, Channel Island Restoration

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To Whom It May Concern:

Please accept this note as the American Association of Wildlife Veterinarian's (AAWV) unequivocal support for the Catalina Island Conservancy's (CIC) Catalina Island Restoration Project; specifically, for the complete removal of mule deer (*Odocoileus hemionus*) from Catalina Island, California. As an anthropogenically introduced, non-native species, mule deer populations have brought about profoundly negative impacts on the natural ecosystems of Catalina Island. Moreover, the effects associated with the presence of this non-native species have not been limited to the landscape. Since their introduction in the 1930s, mule deer populations on Catalina have exceeded the ecosystem's carrying capacity; a situation that now frequently results in starvation and associated welfare issues for these animals. Anthropogenic interventions in response to these pressures, such as supplemental feeding, have failed to curtail browsing, and have often proven only to exacerbate the situation by creating artificial densities of mule deer, thus increasing the risks of disease transmission and suffering.

In response to the destructive pressures applied to the island's habitat by non-native mule deer, the CIC has put forward a program of lethal removal of this species. Following an exhaustive investigation assessing the benefits and costs of various removal methodologies; e.g., the installation of fencing, recreational hunting, the introduction of predators, translocation, and reproductive management, the CIC's informed conclusion to employ lethal removal via aerial sharpshooting has the support of the AAWV. This method of lethal removal is time-tested in the field of wildlife management, and affords the CIC the greatest opportunity to achieve total extirpation of mule deer from Catalina; especially in the context of animal welfare, human safety, efficiency of resources, and time management. It is the express view of the AAWV that the CIC's mule deer removal plan is scientifically well-grounded, informed, safe, humane, and urgently needed.

Sincerely,

John A. Bryan, II, DVM, MS
President, American Association of Wildlife Veterinarians

AMERICAN BIRD CONSERVANCY

November 17, 2023

Letter of Support for the Catalina Island Conservancy's Catalina Island Restoration Project

To Whom It May Concern,

American Bird Conservancy (ABC) is a nonprofit organization dedicated to conserving wild birds and their habitats throughout the Americas. Over the past 50 years, North America has lost almost 3 billion birds[1], with habitat loss, including degradation caused by introduced species, being a leading cause. As bird populations continue to decline and habitats become more fragmented and degraded, it is critical that we take the opportunity where we can to restore habitats to benefit birds and people.

The negative impacts of artificially high deer populations on bird populations has been documented across North America. Using Breeding Bird Survey data for all of North America, a group of 73 widespread species including both neotropical migratory and non-migratory species showed declining numbers as deer (white-tailed deer, black-tailed deer, and moose) numbers increased. Bird species that are known to be sensitive to higher deer densities declined more strongly in states with more deer[2].

On islands off the coast of British Columbia, islands that had had introduced Sitka black-tailed deer populations for more than 50 years had bird populations only 30% to 45% as high as populations of deer-free islands. On islands with long-term deer populations the bird species with the highest dependence on understory vegetation were most affected, and their abundance was only 7% of those on deer-free islands. Deer overabundance decreased bird food resources and reduced nest site quality[3]. In the islands of Puget Sound, black-tailed deer regulated cover and structure of the understory, which, in turn affected bird populations, and deer-free islands supported the most abundant and diverse bird faunas[4].

These anecdotes are from situations where deer are native but their numbers were artificially high. Deer are not native to Catalina Island, and this it can be expected that their impact on birds and their habitat would be even more significant as those habitats' natural condition is without large herbivores.

Surprisingly, deer can even have direct impacts on birds. White-tailed deer are also known to depredate songbird nests, eating both eggs and nestlings. Deer found and depredated both ground- and above-

[1] Rosenberg et al. 2019. Decline of the North American avifauna. Science vol. 366, pp 120-124.
[2] Chollet, S., and J.-L. Martin. 2012. Declining woodland birds in North America: should we blame Bambi? Diversity and Distributions DOI: 10.1111/ddi.12003 http://onlinelibrary.wiley.com/doi/10.1111/ddi.12003/full
[3] Allombert, S., A. J. Gaston, and J.-L. Martin. 2005. A natural experiment on the impact of overabundant deer on songbird populations. Biological Conservation 126: 1-13.
[4] Martin, T. G., P. Arcese, and N. Scheerder. 2011. Browsing down our natural heritage: deer impacts on vegetation structure and songbird assemblages across an island archipelago. Biological Conservation. 144:459-469.

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ground nests, and open bowl-type and covered-bowl nests[5],[6]. Although deer are herbivores and such behavior may be uncommon, direct deer effects on birds could be significant at high deer population densities, such as those found on Catalina Island.

Accordingly, American Bird Conservancy strongly supports the Catalina Island Conservancy's Catalina Island Restoration Project. Completely and permanently removing non-native deer from the island is the only way to allow the island's habitats and the species that rely on them to recover.

Sincerely,

Brad Keitt
American Bird Conservancy
bkeitt@abcbirds.org

[5] Pietz, P. J., and D. A. Granfors. 2000. White-tailed deer (*Odocoileus virginianus*) predation on grassland songbird nestlings. American Midland Naturalist 144(2):419-422. Jamestown, ND: Northern Prairie Wildlife Research Center Online. http://www.npwrc.usgs.gov/resource/birds/deerpred/index.htm (Version 09MAR2001)

[6] Ellis-Felege, S. N., J. S. Burnam, W. E. Palmer, D. C. Sisson, S. D. Wellendorf, R. P. Thornton, H. L. Stribling, and J. P. Carroll. 2008. Cameras identify white-tailed deer depredating Northern Bobwhite nests. Southeastern Naturalist 7: 562-564. [See also many citations referenced in this article.]

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California
BOTANIC GARDEN

November 28, 2023

To whom it may concern,

On behalf of the California Botanic Garden, I am writing to express our strong support for the *Catalina Island Restoration Project*. With more than 86 acres and 95,000 people served annually, California Botanic Garden (CalBG) is the largest botanic garden dedicated to California native plants. We have a mission to conserve California's plant diversity and to enhance human well-being by inspiring and educating the public and the scientific community. Beyond the garden walls, CalBG is regarded as a leading center for research and conservation. The Garden's work has a special focus on California plants including those of Catalina Island. Resident scientists have published a flora of the Island and, more recently, our researchers contributed to the understanding of the evolution of a rare grass native to the Island, *Dissanthelium californicum* (Catalina grass). Further, our living collection, seed bank, and nursery support numerous collections of rare and endemic plants from Catalina Island, providing a safeguard for the unique and irreplaceable botanical diversity.

Catalina Island is a special place for plants. The Island supports 34 plants that are endemic to the Channel Islands, eight of which are restricted to Catalina Island and live nowhere else on earth. One of these extremely rare and endemic species, *Cercocarpus traskiae* (Catalina Island mountain-mahogany) is considered one of the rarest trees in California, with only seven known individuals. *One of the major threats to this extremely rare species is habitat degradation from introduced herbivores.* This threat was recently cited as ongoing in the latest five-year review published for the species by the US Fish and Wildlife in 2021.

The Catalina Island Conservancy manages 48,000 acres on Catalina Island or 88% of the Island. As such, their stewardship is critical to the long-term conservation of the rare, threatened and endemic plants that call the Island home. The *Catalina Island Restoration Project* focuses on three key areas: 1) Habitat restoration to combat soil erosion, conserve endangered species, and reduce wildfire risk. 2) Plant restoration, fostering a seed supply of local native seeds which is essential to reintroducing native plants to the landscape. 3) Non-native species removal including the removal of mule deer and invasive plant species. Invasive species removal is a particularly key component of the restoration project because invasive species are known to have significant impact on islands ecosystems and have been found to be a leading cause of species extinctions on islands.

There is a growing body of evidence demonstrating that the removal of non-native and invasive animals contributes significantly to the restoration and recovery of island ecosystems and species. For example, four federally listed plant species endemic to San Clemente Island, San Clemente Island (SCI) bush-mallow (*Malacothamnus clementinus*), SCI paintbrush (*Castilleja grisea*), SCI lotus (*Acmispon dendroideus* var. *traskiae*), and SCI larkspur (*Delphinium variegatum* subsp. *kinkiense*), were removed from the List of Federal Endangered and Threatened Plants based on species recovery in 2023. Specifically, the US Fish and Wildlife

California Botanic Garden
1500 North College Avenue, Claremont, CA 91711
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Service review indicated that the U.S. Navy's successful removal of non-native herbivores (goats, sheep, pigs, cattle, mule deer) led to recovery of vegetation in areas of severely degraded habitat on San Clemente Island which in turn led to the recovery of these four plant species, such that they no longer require protections under the Federal Endangered Species Act.

As the primary land stewards of Catalina Island, the Catalina Island Conservancy has the important task of ensuring the longevity of imperiled plant species such as the Catalina Island mountain-mahogany. We commend the Catalina Island Conservancy for proposing a comprehensive restoration program that will support restoration and recovery of the Island's biodiversity from multiple angles, including invasive species removal. We look forward to learning of the recovery of endangered species that will result from the removal of invasive non-native herbivores, as has been demonstrated across the other Channel Islands. The plants of Catalina Island deserve this important action for their protection. As the indigenous inhabitants that give Catalina Island its unique sense of place, the native plants of Catalina are an irreplaceable treasure not only to Californians, but also to the world.

Sincerely,

Lucinda A. McDade

Lucinda A. McDade, Ph.D.
Executive Director
Judith B. Friend Director of Research

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1500 North College Avenue, Claremont, CA 91711
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CAL-IPC
CALIFORNIA INVASIVE PLANT COUNCIL

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(510) 843-3902
fax: (510) 217-3500
www.cal-ipc.org

December 14, 2023

Dr. Lauren Dennhardt, Sr. Director of Conservation
Catalina Island Conservancy
P.O. Box 2739, Avalon, CA 90704

Dear Dr. Dennhardt,

I am writing on behalf of the California Invasive Plant Council. Our organization is dedicated to protecting California's environment and economy from invasive plants by supporting the community of land stewards across the state. Though we focus on invasive plants, we are well aware of the damage caused by invasive animals, from shot hole borers killing trees in southern California to South American nutria damaging vegetation in San Joaquin Valley waterways.

The rationale for removing imported mule deer from Catalina Island to protect endemic plants and wildlife has been clearly described by the Catalina Island Conservancy and is well supported by studies of the impacts of introduced grazers on islands. The conservancy has evaluated a wide range of alternatives and selected the one deemed to be the most effective and humane. We agree with the rationale for removing mule deer on the island shared by other environmental groups such as The Nature Conservancy, the Center for Biological Diversity, and the California Native Plant Society.

We also understand and empathize with the deep concern community members have about killing the mule deer, a beloved feature of their local environment. This is one of the many difficult aspects of our modern ecological reality. Having moved organisms around the globe over the last several centuries we are faced with situations where these introductions have resulted in significant ecological harm. We must either address the causes or live with the consequences. In a situation like the one on Catalina Island, we believe that the importance of protecting the survival of species that have evolved over millions of years who are faced with extinction is the greater need, difficult as it is for those of our current generations with a strong personal connection to the deer.

We acknowledge the passion and dedication of all stakeholders involved in this decision, and hope that the community will come to peace with the hard choices needed to ensure the survival of the island's unique biological diversity for future generations.

Sincerely,

Doug Johnson

Doug Johnson
Executive Director

CENTER for BIOLOGICAL DIVERSITY
Because life is good.
working through science, law and creative media to secure a future for all species, great or small, hovering on the brink of extinction.

October 19, 2023

Lauren Dennhardt, PhD
Acting Director of Conservation
Catalina Island Conservancy
Phone: 310-510-1299 x229
P.O. Box 2739, Avalon, CA 90704

Re: Catalina Island Restoration Project

Dear Dr. Dennhardt,

On behalf of the Center for Biological Diversity, I write to express our organization's strong support for the Catalina Island Restoration Project. Given the unique endemic species and ecosystems of Catalina Island - and the growing threats they face from climate change, drought, fire, and invasive species - the restoration project is one of the most important biodiversity protection efforts underway in California.

While climate change - and the consequent intensifying drought and more frequent and intense fires affecting the island- requires global action to address, the actual impacts of climate change on the species and ecosystems of Catalina can be significantly lessened or mitigated with on-the-ground actions that increase the resiliency of native species. In this context, addressing invasive species on the island is critically important.

Invasive species have long been recognized as one of the greatest drivers of extinction, particularly on islands. Last month, the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) released its *Assessment Report on Invasive Alien Species and their Control*, highlighting the significant role invasive species play in the extinction crisis. The report found that invasive species have been a major factor in 60% of recorded extinctions globally, specifically noting that "invasive species are most damaging on islands."[1]

The Channel Islands generally, and Catalina specifically, are home to dozens of rare and endangered species, with Catalina alone hosting 60 species that occur nowhere else on the planet. The greatest past and ongoing threats to these species have come from introduced, non-native plants and animals. But these threats can be successfully addressed: over the past several decades, islands where introduced goats, pigs, deer and other invasive species have been removed have shown remarkable recovery.

On Santa Cruz Island, for example, non-native feral pigs were completely eliminated from the island in 2006, and as a result, the native fox population rebounded, from fewer than 100 foxes in 2004 to now more than 1,200 in the wild. The pig removal also allowed the Channel Islands bedstraw and Santa Cruz Island dudleya to recover from the brink of extinction, so much so that the U.S. Fish and Wildlife

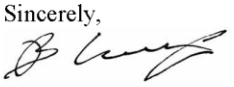
1 https://www.ipbes.net/ias

Service (USFWS) recently proposed them for delisting under the Endangered Species Act (ESA).[2] To protect Santa Rosa Island's endemic flora and fauna, the National Park Service in the 1990's removed all non-native herbivores, including pigs, cattle, elk, and deer. Now that removal is complete, recent surveys document nearly twice as many rare and endemic plant species in study plots as there were in the 1990s.[3] Importantly, in delisting the island fox on San Miguel, Santa Rosa and Santa Cruz islands, USFWS cited the removal on non-native ungulates as a key element in their recovery.[4] Notably, on Catalina Island, where non-native ungulates remain, USFWS determined that the fox remains threatened and still warrants the protections of the ESA.

On Catalina, the non-native deer, introduced to the island almost a century ago for the purpose of hunting, are destroying the ecosystem and pushing several endemic plants to the very edge of extinction. Many of these plants evolved without defense mechanisms to protect against deer herbivory. With no natural predators, the deer population repeatedly grows and then contracts, as animals starve or die of thirst during drought years. Consequently, the deer overgraze the island, and in the process have destroyed the natural habitats that support native wildlife and serve other crucial ecological functions, such as erosion control, groundwater recharge, and wildfire resilience. The impacts of deer on the island have been exacerbated by the severe drought of recent decades, impacts that will only grow in the face of climate change. True recovery of the species and ecosystems of Catalina is impossible so long as the deer herd remains on the island.

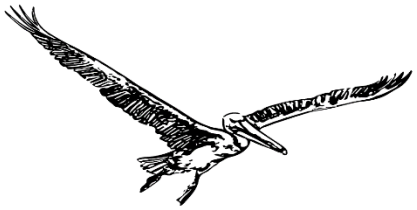
While all the components of the Catalina Island Restoration Project are important, the single most impactful thing that can be done to protect the unique and irreplaceable plants of Catalina Island is to remove the introduced, non-native deer from the island. We look forward to the recovery and increased resilience of the native plants, animals, and ecosystems on the island as the program is implement.

Sincerely,



Brendan Cummings, Conservation Director
Center for Biological Diversity
1212 Broadway, Suite 800
Oakland, CA 94612
bcummings@biologicaldiversity.org

2 50 Fed. Reg. 7322 (12/01/2022)
3 https://www.usgs.gov/news/featured-story/livestock-gone-islands-decimated-native-flora-makes-a-comeback
4 81 Fed. Reg. 53315 (8/12/2016)



CALIFORNIA INSTITUTE
OF ENVIRONMENTAL STUDIES

P.O. Box 1185
Davis, CA 95617
(530) 400-1512

October 25, 2023

To Whom It May Concern,

I am writing on behalf of the California Institute of Environmental Studies (CIES) to confirm support for the Catalina Island Conservancy's (CIC) island restoration project which includes, in part, eradicating introduced mule deer from Catalina Island. CIES is a California-based nonprofit organization with over 40-years' experience advancing conservation of coastal and marine birds and healthy island ecosystems in the Pacific region through sound science, restoration, partnerships, and community outreach. Our organization is well versed in efforts to conduct restoration work on the Channel Islands, having participated in numerous restoration and conservation projects on seven of the eight islands.

CIC's comprehensive restoration project is designed with the best science available and is in line with the best practices and approaches used across the world for island conservation. These global island conservation best practices regularly use helicopters to eliminate introduced mammals (e.g., deer, pigs, goats). Once removal of destructive mammals has occurred, restoration of the island ecosystem can be truly initiated. This includes actions such as removal of non-native vegetation that crowd out native plants, degrade wildlife habitat and alter fire cycles and soil chemistry. It also includes conducting plant restoration in conjunction with the invasive plant control work. The plant restoration work includes using techniques such as creating a seed farm so that native seeds can be produced in bulk and used for restoration efforts. It also includes out-planting native plants grown in an on-island native plant nursery that helps ensure the recovery and maintenance of a resilient ecosystem. All these actions are included as part of CIC's plan.

In conclusion, the CIC habitat restoration project is well designed, and its implementation is essential to restoring a healthy ecosystem by preventing erosion of soils, promoting native vegetation, and building resiliency to wildfires. Ultimately these actions are essential so that the unique plants and animals of Catalina Island not only persist but thrive, resulting in a functioning ecosystem. It is important to understand that the restoration of the Catalina Island ecosystem cannot occur until all the introduced mule deer are removed from the island. CIES supports the CIC habitat restoration project because it follows the best available science and methods as seen across hundreds of global island conservation efforts.

Sincerely,

Michael Parker

Michael Parker
Executive Director

CALIFORNIA
NATIVE PLANT SOCIETY
2707 K Street, Suite 1, Sacramento, CA 95816-5130 (916) 447.2677 www.cnps.org

Protecting
California's native
flora since 1965

October 30, 2023

Re: Support for the Catalina Island Restoration Project

To Whom It May Concern,

I am writing on behalf of the California Native Plant Society (CNPS) in support of current efforts to improve the conservation and management of native biodiversity on Catalina Island via the Catalina Island Restoration Project. CNPS is a non-profit environmental organization with more than 12,500 members in 36 local chapters. Our mission is to protect California's native plants and their natural habitats, today and into the future, through science, education, stewardship, gardening, and advocacy.

Catalina Island is home to more than 60 species of plants and animals that are found nowhere else on Earth. According to the CNPS Rare Plant Inventory, the Island is home to 72 rare plant taxa, eight of which are Catalina Island endemics, and five of which are listed as threatened or endangered under the California and/or Federal Endangered Species Acts[1]. Furthermore, 34 of these taxa are endemic to the Channel Islands. On the extreme side of rarity, Catalina is home to one of the world's rarest plant species, Catalina Island mountain mahogany (*Cercocarpus traskiae*), which is now known from only seven individuals in the wild. The remarkable diversity on Catalina Island, and the fact that so many of its species are so rare and of extremely limited distribution, makes their conservation vital.

Since European colonization, the flora and fauna of the Catalina Island continue to be impacted by a number of threats, including climate change, the spread of invasive species, and impacts from feral herbivores. Animals introduced to the island include pigs, goats, sheep, bison, and deer. Each of these species has caused negative impacts to the flora of the island. While feral pigs, sheep, and goats have been eliminated from the island, and bison are managed to minimize ecosystem impacts, the impacts from introduced mule deer continue to be severe and wide-ranging. Over the past decades, the Catalina Island Conservancy has implemented measures including increased hunting permits for deer to reduce population levels and fencing of rare plants to limit harm caused by herbivory. Despite these actions, the population of deer on the island has not been reduced significantly, and the impacts to sensitive resources continue to increase.

For decades, the Catalina Island Conservancy and researchers have documented impacts caused by introduced mule deer. Deer over-browsing is decreasing the density of vegetation, with significant impacts to both rare and common plant species. This is resulting in the death of individual plants, erosion, and the spread of non-native, invasive plant species. The continued presence of deer on the Island presents grave implications for a number of critically imperiled

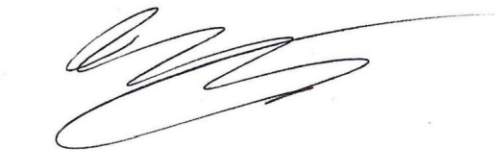
[1] https://rareplants.cnps.org/

rare plant species. We are specifically concerned that populations of some rare species will be extirpated, and species could go extinct without the complete removal of deer on the island.

The management of introduced animals, as currently proposed by the Catalina Island Conservancy, is not a novel concept on island ecosystems worldwide. Scientists have documented the recovery of species and habitats that has resulted after non-native animals are removed. For example, on nearby Santa Rosa Island, the National Park Service undertook a decades-long effort to remove non-native herbivores including pig, deer, elk, and cattle[2]. Remarkably, the recovery of habitats following this action has been quite rapid with nearly all rare plant species increasing in abundance following feral herbivore removal. Most importantly, follow-up surveys have documented nearly twice as many rare and endemic species compared with surveys in the 1990s, prior to removal. On San Clemente Island, the eradication of non-native herbivores in the 1990s led to the recovery and delisting of four taxa listed under the Federal Endangered Species Act (ESA). Of additional significance is that these four taxa were some of the very first plants to be listed under Federal ESA. These examples from Santa Rosa and San Clemente Islands give us reason to believe that positive change will occur on Catalina Island following the removal of introduced deer.

For these reasons, CNPS supports the Catalina Island Restoration Project. The most important aspect of the plan from the perspective of habitat management and the recovery of rare and endemic plant species is the removal of introduced deer. The global biodiversity crisis and California's perilous ranking for national plant extinction[3], necessitate these actions to protect Catalina Island's rare plant species and their recovery.

Sincerely,



Nick Jensen, PhD
Conservation Program Director
California Native Plant Society
2707 K Street, Suite 1
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njensen@cnps.org

[2] https://www.usgs.gov/news/featured-story/livestock-gone-islands-decimated-native-flora-makes-a-comeback

[3] https://www.natureserve.org/bif

ENDANGERED HABITATS LEAGUE

DEDICATED TO ECOSYSTEM PROTECTION AND SUSTAINABLE LAND USE

December 3, 2024

VIA ELECTRONIC MAIL

Charlton Bonham, Director
California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

RE: Catalina Island Restoration Project – *Support*

Dear Director Bonham:

Endangered Habitats League (EHL) *supports* ecological restoration and climate-resilient actions on Catalina Island as provided in the Cataline Island Restoration Project. For your reference, EHL is a Southern California regional conservation group dedicated to ecosystem protection and sustainable land use.

EHL is concerned that invasive species such as deer have had adverse impacts on the island for decades, and it is imperative to act now to halt and reverse the damage. Catalina Island has more than 60 endemic plant and animal species. The Catalina Island Restoration Project is critical to protect the biodiversity and integrate management for island residents and visitors.

The Channel Islands are unique ecosystems in their own right, and natural communities have evolved apart from the mainland. It is important to respect these attributes. As the only accessible island in Southern California, Catalina is an important entry point for millions of people in Southern California to connect with one of the richest island ecosystems in the world. The Channel Islands can offer a chance to see what California was like prior to European arrival.

EHL supports the Catalina Island Restoration Project because it will provide the proper basis for science, education, and nature. We thus urge the California Department of Fish and Wildlife to support the Restoration Project, *including the most humane and effective programs available to remove invasive species*. Eradicating the mule deer is a vital and foundational component of the Restoration Project, and will enable the ecosystem to recover from overgrazing and trampling. Studies have shown that aerial hunting, as proposed in the permit, is the most humane and effective method of deer removal, minimizing stress levels of deer significantly more than translocation and birth control. Despite Catalina Island having the longest recreational hunting season in the state, the mule deer population continues to grow unchecked, indicating that recreational hunting alone is not a viable method of controlling mule deer population.

Catalina Island's ecosystems as we know them are truly at risk. Without protective measures, many native and endemic species face extinction, and the Island may no longer be able to withstand climate change or support diverse ecosystems for years to come. The effects of disappearing species are already evident, as native chaparral habitats disappear and transition into invasive annual grasslands. Native plants on the Island absorb and retain water and are drought-resistant, acting as natural protection against wildfire and providing important habitat for native animal species. When these native plants are threatened by non-native wildlife and other risks, the Island is vulnerable to devastating climate threats such as wildfire and drought. A catastrophic wildfire is inevitable, such as the 2007 Island Fire. Droughts

are similarly unavoidable and disastrous, such as the 2011-2017 drought on the Island, which caused wildlife to die of dehydration and starvation in large numbers and residents to rely on polluting desalination plants. The Catalina Island Restoration Project will safeguard the Island from similar catastrophic impacts, lessening the damage to the Island and bolstering the Island's ability to recover.

The Catalina Island Conservancy is an exemplary steward of Island resources, successfully balancing conservation, education, and recreation. Their Catalina Island Restoration Project is a science-based, comprehensive plan to protect the Island's biodiversity, reduce erosion, prevent wildfires, and create a sustainable environment where nature and humans will thrive for years to come. The implementation of the Restoration Project is urgent due to the heightened climate threats to the plant and animal species, residents, and ecosystems of the Island. Without the Restoration Project, communities across Southern California could lose access to one of the largest and most unique outdoor classrooms, residents would be prey to climate-induced stresses, and the world could lose species found nowhere else on earth.

We thank you for your time and greatly look forward to working together to ensure that Catalina Island will be preserved for generations to come.

Yours truly,

Dan Silver
Executive Director

FRIENDS OF THE LA RIVER

570 W. AVE 26 #250
LOS ANGELES
CA 90065
323.223.0585
CONTACT@FOLAR.ORG

12/5/24

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Re: Support the Catalina Island Restoration Project

Dear Director Bonham,

On behalf of Friends of the Los Angeles River, I am writing to express our organization's support for a healthy, climate resilient, and fire-resistant Catalina Island where humans and nature can thrive for years to come. Invasive species have had adverse impacts on the island for decades, and it is imperative to act now to halt and reverse the damage. Catalina Island is a special place for the many species who live on and visit the Island, with more than 60 endemic plant and animal species, 3,500 year-round residents, and a terrain that offers ample recreational opportunities for over one million annual visitors. The Catalina Island Restoration Project is critical to protect the biodiversity that will secure climate resilience for an important resource for communities across California to learn about and experience unique landscapes and species.

FoLAR supports the Catalina Island Restoration Project because Catalina Island serves as a gateway to science, education, and nature for Catalina Island residents and visitors. We urge the California Department of Fish and Wildlife to support the Restoration Project. As the only accessible island in Southern California, Catalina is an important entry point for millions of people in Southern California to connect with one of the richest island ecosystems in the world through hiking, camping, snorkeling, and much more. These visitors include thousands of youth per year who participate in overnight camps centered on outdoor science and adventures, creating a foundation for the next generation of environmental leaders and stewards. Catalina Island's unique wildlife and recreation opportunities generate millions in visitor-driven revenue, supporting the people living and working on the island, many of whom have called the Island home for generations.

Catalina Island's ecosystems as we know them are at risk. Without protective measures, many native and endemic species face extinction, and the Island may no longer be able to withstand climate change or support diverse ecosystems for years to come. The effects of disappearing species are already evident, as native chaparral habitats disappear and transition into invasive annual grasslands. Native plants on the Island absorb and retain water and are drought-resistant, acting as natural protection against wildfire and providing important habitat for native animal species. When these native plants are threatened by non-native wildlife and other risks, the Island is vulnerable to devastating climate threats such as wildfire and drought. A catastrophic wildfire is inevitable, such as the 2007 Island Fire, in which 10% of the Island burned and 700 residents and visitors were forced to evacuate. Droughts are similarly unavoidable and disastrous, such as the 2011-2017 drought on the Island, which caused wildlife to die of dehydration and starvation in large numbers and residents to rely on highly polluting desalination plants. Support for the Catalina Island Restoration Project will safeguard the Island from similar catastrophic impacts, lessening the damage to the Island and bolstering the Island's ability to recover.

The Catalina Island Conservancy is an exemplary steward of Island resources, successfully balancing conservation, education, and recreation. Their Catalina Island Restoration Project is a science-based, comprehensive plan to protect the Island's biodiversity, reduce erosion, prevent wildfires, and create a sustainable environment where nature and humans will thrive for years to come. The implementation of

FRIENDS OF THE LA RIVER

570 W. AVE 26 #250
LOS ANGELES
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the Restoration Project is urgent due to the heightened climate threats to the plant and animal species, residents, and ecosystems of the Island. Without the Restoration Project, communities across Southern California could lose access to one of the largest and most unique outdoor classrooms, thousands of residents could lose their homes, and the world could lose species found nowhere else on earth.

We thank you for your time and greatly look forward to working together to ensure that Catalina Island will be preserved for generations to come.

Best,

Candice Dickens-Russell
President & CEO

Gabrieleno
San Gabriel Band of Mission Indians

December 3, 2026,

Dear Supervisor Hahn,

As a member of The San Gabriel Band of MIssion Indians, who have stewarded Tovaangar (The Los Angeles Basin and Southern California Channel Islands), including Pimu (Catalina Island) since time immemorial, I am writing to express my support for Operation Protect Catalina Island and the Catalina Island Conservancy's island restoration work.

This effort will safeguard the island's future by making Catalina more resilient to climate change and catastrophic wildfire. Invasive species have harmed Catalina for decades, and it is imperative to act now to halt and reverse the damage. Catalina is home to more than 60 plant and animal species found nowhere else on Earth. Pimu holds important cultural artifacts that we are still uncovering,such as its soapstone quarries, which also provide invaluable insight into the cultural practices of Gabrieleno-Tongva tribes. On a personal level, Catalina is also where we have continued to explore and connect with our ancestors. Preserving the Island for future generations is deeply important to me. We recently entered into an MOU with the Conservancy and hope that our relationship will continue to grow through engaging conversations, especially considering the cultural sensitivity of the island.

I support this restoration work because Catalina serves as a gateway to science, education and nature-based experiences for both residents, visitors and those of us with cultural ties to the land. Through access to a healthy Catalina and partnership with the Catalina Island Conservancy, my community and I are able to gather shells, rocks, elderberry, materials for basketry and other plants for food, medicine and cultural activities.

Without protective action, Catalina's ecosystems are at serious risk, such as our beloved White Sage and Catalina Island Fox. Many native and endemic species face extinction as invasive plants and animals spread. The loss of native chaparral gives ways to invasive annual grasses, which now dominate 35% of ecosystems on the Island. Our cultural practices and material gathering on Pimu is at risk when non-native plants and animals, like mule deer, are allowed to flourish.

Thank you for your leadership and for all you are doing to protect the people, wildlife and cultural beauty of Pimu. With your support, we can ensure a healthy, resilient Island for everyone.

Sincerely,

Kimberly Johnson

Kimberly Johnson Tribal Secretary, San Gabriel Band of Mission Indians led by the Gabrieleno Tongva Tribal Council

March 1, 2024

To whom it may concern:

On behalf of the Global Conservation Consortium for Oak (GCCO)-Oaks of the Californias' Working Group, we are writing in support of the Catalina Island Restoration Project. The Global Conservation Consortium for Oak, in partnership with Botanic Gardens Conservation International (BGCI), is a coordinated network of institutions and experts who work collaboratively to develop and implement a comprehensive conservation strategy to prevent the extinction of the world's oak species. The GCCO has over 100 members in the Western US and are working to initiate, support and collaborate on projects that mitigate threats to the priority, threatened oaks in this biodiverse region. More specifically, the GCCO follows the data and information provided in the Red List of Oaks 2020 Report (Carrero et al., 2020) and the Conservation Gap Analysis of Native US Oaks (Beckman et al., 2019) to prioritize and guide their conservation and research efforts.

These reports identified numerous priority threatened oaks native to California: *Quercus cedrosensis, Quercus dumosa, Quercus engelmannii, Quercus pacifica*, *Quercus parvula,* and *Quercus tomentella*, several of which are native to Catalina Island. As part of the GCCO efforts to conserve these species of concern, the GCCO Western US regional group worked together to draft a conservation action plan. They had in-depth discussions on the species threats and challenges, and then identified what we can do as a group to mitigate the most imminent threats to the species conservation status. The final action plan can be accessed on the GCCO website. One of the main threats identified for the oaks native to Catalina are the impacts from browse, affecting the oaks population and health, reducing regeneration, as well as the survival of the young oaks. This has led to a large decline in the oak populations native to the island. The reduction of the oak woodland can negatively impact the surrounding ecosystem. The action plan identified specific activities to initiate that would address the negative impacts from browse so as to restore and replenish the native oak populations on the island.

Overall, the Catalina Island Restoration Project will complement and inform the work being done by the Global Conservation Consortium for Oak and advance the collective goals of the broader oak conservation community.

The GCCO is greatly supportive of this restoration project. This is an opportunity to set a baseline for future oak conservation. Oaks are declining globally, so the preservation of the Catalina Island oak populations is critical in contributing to the persistence of these valuable oak species and the many benefits and services they provide to the ecosystem. Please feel free to reach out with any questions or concerns. Thank you for your time and consideration.

Kind regards,
Silvia Alvarez-Clare, PhD
Global Lead of the GCCO
salvarezclare@mortonarb.org

Amy Byrne,
Global Tree Conservation Manager/GCCO Coordinator
abyrne@mortonarb.org

Ensenada, Baja California, Mexico.
November 22, 2023.

To Whom It May Concern:

Re: Letter of Support for the Catalina Island Restoration Project.

On behalf of Grupo de Ecología y Conservación de Islas (GECI), I want to express our strong support for the Catalina Island Restoration Project led by The Catalina Island Conservancy.

For 25 years, our organization has been devoted to the ecological restoration of Mexican Islands. Based on our experience, it is clear to us that the only way to restore the native flora of an insular ecosystem is through the removal of invasive alien species, followed by active restoration. We have witnessed examples of severe degradation of entire vegetation communities due to the presence of introduced herbivores. Guadalupe, Socorro, and María Magdalena islands in the Mexican Pacific are examples of how goats, sheep, and introduced white-tailed deer modify the native flora composition and promote soil erosion, with negative impacts on the entire ecosystem's functions and services.

On Guadalupe, after goats were introduced, the plant communities either disappeared or remained as isolated individual plants. At least 26 plant taxa became extinct or were extirpated. On Socorro, the ecosystem was impacted by feral sheep for more than 150 years. A vast area on the island was transformed from a rich community of ferns, vines, shrubs, and trees to a savanna-like open habitat with dominance of exotic plants and heavy sheet and gully erosion. On Magdalena Island, introduced white-tailed deer are threatening the populations of at least six plant species, some of them endemic to the archipelago.

On big islands with complex terrain such as Guadalupe, Socorro, and Catalina, the most efficient and therefore humane method to knockdown the population of ungulates is using a skilled hunter targeting animals from a helicopter. This is a method that has been used widely on islands across the world and proved successful in aiding in reducing the duration of eradication campaigns and animal suffering in consequence.

The alteration of these unique ecosystems is the consequence of human intervention, so we are thus ethically responsible to reverse our impact and promote recovery as much and as fast as we can. After sheep were eradicated from Socorro vegetation cover immediately started to increase. Only four years after the eradication, 11% of the island's bare ground surface recovered the vegetation layer. In addition, soil erosion started to decrease, as well as soil compaction which facilitated the recolonization of plants. The island harbors a lot of endemic animal species, such as landbirds and a lizard. As the habitat started to recover, the abundance of these species did. Guadalupe, and the other Channel Islands where herbivores have been removed, are great examples of how insular ecosystems can recover once herbivores are removed. Guadalupe Island shares 153 plant species with Catalina Island. Catalina nightshade (*Solanum wallacei*), Feltleaf ceanothus (*Ceanothus arboreus*), and Island oak (*Quercus tomentella*) have recovered remarkably on Guadalupe once pressure by herbivory was released. On Catalina these species are still considered the highest priority based on rarity, they continue to be threatened by deer browsing. The Catalina Island Conservancy is seeking to change that.

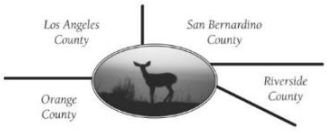
Sincerely,

Dr. Federico Méndez Sánchez
Director General

Grupo de Ecología y Conservación de Islas, A.C.
Av. Moctezuma 836, Zona Centro, Ensenada, B.C., México 22800 Tel. (646) 173 4943 y 173 4997
www.islas.org.mx federico.mendez@islas.org.mx FB: Conservación de Islas

Hills For Everyone

Southern California comes together at the Puente-Chino Hills



January 21, 2025

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Re: Support the Catalina Island Restoration Project

Dear Director Bonham,

On behalf of Hills For Everyone I am writing to express our organization's support for the Catalina Island Restoration Project. Invasive species have adversely impacted the island for decades, and it is imperative to act to reverse the damage. Catalina Island is a special place for the many species who live on and visit the Island. With more than 60 endemic plant and animal species, 3,500 year-round residents, and a terrain that offers ample recreational opportunities for over one million annual visitors, this Restoration Project is critical. It will help protect the biodiversity that will secure climate resilience for this wonderful and unique landscape.

With the presence of nesting bald eagles in Anaheim Hills and the Prado Basin, those of us who live on the mainland are reaping the benefits with the bald eagle restoration efforts that occurred on Catalina.

The Island's ecosystems are at risk. Without protective measures, many native and endemic species face extinction, and the Island may no longer be able to withstand climate change. The effects of disappearing species are already evident, as native chaparral habitats transition into invasive annual grasslands. Native plants on the Island absorb and retain water and are drought-resistant, acting as natural protection against wildfire while providing important habitat for native animal species. Without them, catastrophic wildfire is inevitable, such as the 2007 Island Fire, in which 10% of the Island burned and 700 residents and visitors were forced to evacuate.

We support the Catalina Island Restoration Project to safeguard the Island from more catastrophic impacts and bolster the Island's ability to recover.

Yours truly,
Claire W. Schlotterbeck

Claire W. Schlotterbeck
Executive Director

FROM THE DESK OF

KERI DEARBORN

January 25, 2024

To Whom It May Concern,

As an environmental educator and island fox (*Urocyon littoralis*) advocate since 2003, I am writing to support the Catalina Island Conservancy's (CIC) implementation of their island restoration project and the unfortunate, but necessary, removal of introduced mule deer (*Odocoileus hemionus*).

It is a tragedy that individual animals must pay the price for misinformed human actions of the past. The human introduction of mule deer in the 1930s to Catalina Island has been a slow-burning disaster for the fragile and isolated island ecosystem. Without natural predators, the deer population lives through boom/bust cycles that devastate rare island endemic plants, reduce mid-story nesting habitat for bird species, impact resources for island foxes and other island endemics, exacerbate island erosion, and cause periodic starvation events in the deer population.

Around the world, island ecosystems face catastrophic destruction because of intentional and accidental human introduction of species. CIC has tried to manage the mule deer population through recreational hunting permits, but this effort has failed. Unfortunately, rapid lethal removal of introduced species is more humane than slow decline and offers the best opportunity for island ecosystem restoration. In the last two decades, the method of aerial sharpshooters has been deployed to remove feral pigs on Santa Cruz Island and mule deer and elk on Santa Rosa Island. In both cases, the island ecosystems have finally began to heal from a century of over browsing. Island fox numbers have recovered to historic highs on these two islands. Native oak seedlings are finally able to survive and island endemic plants are returning to provide habitat for island species and migratory birds.

The lethal removal of a species is never a desired option, but in this situation science and experience demonstrate that the best choice for restoring the island ecosystem and protecting a wide range of endemic island species is the humane removal of the mule deer.

Sincerely,

Keri Dearborn

20982 AVE SAN LUIS, WOODLAND HILLS CA 91364

4animalbytes@gmail.com

IRVINE RANCH CONSERVANCY

December 1, 2023

Re: Support for the Catalina Island Restoration Project

To whom it may concern,

On behalf of Irvine Ranch Conservancy (IRC), I am writing to express our organization's enthusiastic support for the Catalina Island Restoration Project. As climate change continues to exacerbate threats to the island's ecosystems, including invasive species, fire, and drought, an ambitious and comprehensive approach is essential to preserve and restore critical habitats.

As a mainland counterpart to Catalina Island Conservancy (CIC) with a shared mission, IRC is well positioned to evaluate and endorse this project. Both the State of California and the United States Department of Interior have designated nearly 40,000 acres of open space in Orange County as the Irvine Ranch Natural Landmarks, and my organization protects, restores, and enhances approximately 30,000 acres of this landscape on behalf of a collection of public landowners while ensuring environmentally responsible and sustainable public access. Like Catalina Island, this open space is contained within the California Floristic Province global biodiversity hotspot and is unique due to its proximity to major population centers. In our area, the major threats to habitat quality are also largely rooted in the legacy of grazing, in our case by cattle, which has led to the invasion of native shrubland by non-native grasses that in turn have contributed to increasingly frequent fire.

The challenges facing Catalina are even more urgent due to the more than 60 endemic species, isolation, and introduced deer, whose population is growing unchecked due to the lack of predators. The resultant overgrazing is destroying the ecosystem and pushing several endemic plants toward extinction while compromising ecological functions.

The Catalina Island Restoration Project arose out of an extensive strategic planning process and is consistent with best practices for ecological restoration practiced by my organization and others. Neutralizing critical threats, especially invasive plants and animals, followed by seed-based restoration of native habitats has proven to be a highly effective intervention in Southern California and beyond. Importantly, the limited wild seed collection with bulking at the seed farm will ensure a sustainable supply of genetically appropriate plant materials that will allow CIC to adaptively manage the project even in the face of stochastic conditions.

This project promises to help protect Catalina's precious biological resources for generations to come, and we at IRC look forward to contributing to its success in any way that we can.

Sincerely,

Nathan Gregory, PhD.
Interim Senior Vice President and Chief Programs Officer

4727 Portola Parkway, Irvine, Ca 92602 | 714.508.4757 | FAX 714.508.4758

ISLAND CONSERVATION
Preventing Extinctions

630 Water St, Santa Cruz, CA 95060 831-359-4787 www.islandconservation.org

November 27, 2023

Letter of Support for the Catalina Island Restoration Project

To Whom It May Concern,

Island Conservation would like to express our full support for the Catalina Island Restoration Project led by the Catalina Island Conservancy (Conservancy). Island Conservation's mission to prevent extinctions by removing invasive species from islands has been the cornerstone of our actions since 1994. With our partners, we have successfully restored 71 islands worldwide, benefiting hundreds of at-risk populations and species. With this experience, we recognize the profound importance of the work the Catalina Island Conservancy is undertaking. The Conservancy's plan to remove the non-native mule deer population from the island is a crucial step towards protecting Catalina's unique biodiversity and delicate ecosystem.

The continued presence of these invasive ungulates threatens the native plant and animal species that call Catalina home, including over 60 species that are found nowhere else on earth. Due to their direct negative impact on native vegetation, mule deer are contributing to the loss of native habitats, increased soil erosion, and decreased water capture on Catalina. The removal of the non-native deer is necessary to address these issues as part of the Catalina Island Restoration Project.

The method proposed by the Conservancy to complete the removal effort, including the use of highly skilled hunters in helicopters, has been proven globally to be an effective and efficient solution. This method was used to complete the removal of goats from Galapagos Islands between 1997 and 2006, pigs from Santa Cruz Island between 2005 and 2007, deer and elk from Santa Rosa Island between 2011 and 2015, and many other successful island restoration efforts. The removal of non-native ungulates allowed for the natural recovery of these ecosystems and for land managers to take more meaningful actions to support recovery, just as the Conservancy plans to do with the development of landscape scale restoration and long-term monitoring plans for Catalina following the removal of deer.

Island Conservation supports the Catalina Island Conservancy's full initiative to restore Catalina Island, a process that must start with the removal of the mule deer to achieve full benefits to the ecosystem. The success of this project will help to create a more resilient Catalina Island and will serve as an inspiration to the field of conservation.

Kind regards,

Penny Becker
Vice President, Conservation
Island Conservation

LOMA LINDA UNIVERSITY
School of Medicine

17 October 2023

To whom it concerns,

I am writing to express my support for the removal of deer from Catalina island.

As an invasive species, deer cause incontrovertible damage to natural ecosystems. Many dozens of studies across the globe – including quite a few from various islands – have documented the damage. Vegetation disturbance ranges from the architecture of individual plants to the functioning of entire ecosystems, and often affects rare plant species, forest regeneration and structure, understory volume and diversity, and nutrient cycling. Invasive deer also impact animals, including invertebrates, amphibians, small mammals, and songbirds, either directly or through cascading effects. Ample well-designed studies from Catalina Island support some of these findings as well. Collectively, the literature leaves no room for doubt.

If I may say so, the presence of deer on Catalina serves only the self-indulgent interests of humans at the expense of many other organisms.

I have full confidence that the Catalina Conservancy personnel fully understand the ramifications of a non-native deer population. Thus, I encourage thoughtful consideration of their advice.

Sincerely,

William K. Hayes

William K. Hayes, Ph.D.
Professor of Biology

A Seventh-day Adventist Organization
DEPARTMENT OF EARTH AND BIOLOGICAL SCIENCES | Griggs Hall, Room 101, Loma Linda, California 92350
909-558-4530 • *fax* 909-558-0259 • www.llu.edu

United States Department of the Interior

NATIONAL PARK SERVICE
Channel Islands National Park
1901 Spinnaker Drive
Ventura, California 93001-4354

IN REPLY REFER TO:
1.A.2 (N2219) - CHIS

February 1, 2024

Whitney Latorre
CEO/President, Catalina Island Conservancy
PO Box 2739
Avalon, CA 90704

Ms. Latorre:

Located off the coast of Southern California, the eight Channel Islands encompass a diverse and unique environment like few places on earth. Isolated from the mainland for millennia, the islands support sensitive, unique, and rare plants and animals, fragile ecological communities, and sacred cultural sites. In recognition of the uniqueness and special fragility of these resources, five of the islands—Anacapa, Santa Cruz, Santa Rosa, San Miguel, and Santa Barbara—and the submerged lands and waters within 1 nautical mile of each island, were designated by Congress as Channel Islands National Park (park) on March 5, 1980.

Since that time, the park and other land stewards within the archipelago—The Nature Conservancy, the US Navy, and the Catalina Island Conservancy—have worked to reverse the ecological impacts of over 100 years of degradation caused by past land management practices and the introduction of non-native species that left the islands in various states of ecological degradation. Early park managers recognized that ecological restoration must start by first removing the threats—non-native animals—which were the root cause of ongoing environmental degradation. Subsequently, the park and its partners undertook a comprehensive and sometimes controversial initiative to remove deer, elk, pigs and various other introduced animals from park lands.

As a result of our efforts, the islands are recovering. Just a few months ago, the park and its partners celebrated the removal of two plant species (Santa Cruz Island Dudleya and Island Bedstraw) from the Endangered Species List and we expect to recover additional plant species in the years to come. In 2015, the park and its partners celebrated the delisting of the island fox, one of the greatest conservation success stories of our time, and one that required the removal of introduced pigs from Santa Cruz Island. Vegetation communities and native animal assemblages on all islands where ungulates were present and removed are recovering. These successes show that nature can recover once threats—like non-native animals—are removed.

Now, Catalina Island faces similar ecological challenges. The Catalina Island Conservancy's Catalina Island Restoration Project builds on lessons learned from animal removal projects at the park and from around the world. The plan includes well-established and vetted methods that have been proven to quickly, safely, and humanely remove non-native animals, along with other essential conservation tools such as seed farming, out-planting, and weed control.

The Catalina Island Conservancy has developed a comprehensive restoration plan that focuses on addressing the root causes of ecological degradation. Based upon our success at the park using similar practices, we believe your plan will bring about substantial environmental benefits for Catalina Island, enhance the Conservancy's ability to effectively manage resources into the future, and contribute to restoration efforts of all partners across the archipelago.

If you have questions or would like to learn more about conservation successes at Channel Islands National Park, please contact Ken Convery, Chief of Natural Resources Management, at ken_convery@nps.gov.

Sincerely,

Ethan McKinley
Superintendent

Santa Barbara Botanic Garden

November 10, 2023

Letter of Support for the Catalina Island Conservancy's Catalina Island Restoration Project

To Whom It May Concern:

Santa Barbara Botanic Garden has conducted research on the Channel Islands for nearly 100 years. Through this research, which has included documenting damage and recovery from years of ranching or other uses, it is clear that one of the most critical restoration activities for these island ecosystems is the removal of feral non-native animals. This action alone allows for the recovery of many native plants that cannot survive with grazing, browsing, or rooting pressure. Efforts to restore many native species without controlling these feral non-native animals have been unsuccessful. Alternatively, the control of feral animals on San Clemente, San Nicolas, Anacapa, Santa Cruz, Santa Rosa, and San Miguel has yielded positive ecological benefits.

The Channel Islands are home to some of the most unique plant species on the planet, many of which are found nowhere else on Earth. These island species have had no need for protective chemicals, thorns, and other defenses that have otherwise protected mainland species from mule deer overbrowsing. Additionally, the natural predators that help to keep deer populations in check on the mainland do not exist on Catalina Island. The result is severe overbrowsing which destroys natural habitats, causes significant erosion problems, reduces groundwater recharge, and threatens the continued existence of many of the 60 plant species that occur only on Catalina Island as well as the native wildlife that they support. It's also important to recognize the impact on the deer population itself, as degraded environmental conditions lead to starvation and disease.

Even with the research showing the above effects, this type of intervention is not taken lightly, and I know the Catalina Island Conservancy has studied alternative solutions to impacts from introduced mule deer on the plant species of the island extensively. Other alternatives have already been attempted and failed. The only way to restore and maintain the native plant and animal diversity on the island is to remove these animals.

Precision hunting, which is the recommended means of removing these species on other California islands and island systems around the world is at once humane, safe, and effective at starting the fragile island systems on the road to recovery. We understand the concerns of those opposed to the removal of mule deer, but we urge everyone to consider the long-term impacts - on plants, other animals, and people - if we do not act. Please support these efforts to restore the island so it can flourish for generations to come.

Sincerely,

Steve Windhager, Ph.D.
Executive Director

1212 Mission Canyon Road
Santa Barbara, CA 93105
805.682.4726

SBBotanicGarden.org

Channel Islands
CALIFORNIA STATE UNIVERSITY
DIVISION OF ACADEMIC AFFAIRS

October 16, 2023

To Whom it May Concern,

I am writing in staunch support of the current efforts by the Catalina Island Conservancy (CIC) to remove deer from the island. The presence of the deer has been a long-standing concern, frustration and struggle in managing the restoration and conservation of the lands with which the CIC is charged, and that countless people hold dear.

Having worked on Catalina Island from 2006-2010 conducting Invasive Species control and eradication as well as trapping Island foxes for 5 seasons, I have seen first-hand the devastation the deer have caused, and the poor health in which they constantly struggle to maintain. I have also seen the countless vehicle strikes killing deer, visitors using them as stage props for their children to take photos, as well as deer coming into Avalon to eat peoples landscaping.

It is well known and documented that the deer were introduced to the island by the California Department of Fish & Wildlife for the sole purpose of hunting. That's correct. In short, they were introduced with the sole purpose of being killed. They are not native to the island - on the mainland, deer populations migrate throughout the seasons looking for food and climates that are more tolerable. They do not have this option on islands, which is a major reason they cause so much damage and why they are starving to death. Other Channel Islands land managers have been successful in removing non-native ungulates and the response of island vegetation has been astoundingly dramatic. Santa Rosa Island is the most recent success story in the archipelago on this front. Deer are also one the major contributing factors of tick presence on Catalina Island, which also poses human health concerns. Ticks are known to carry lime disease, recurring fever and other virus loads that can cause long-term health challenges for residents and visitors alike.

Given the opposition related to deer removal for Catalina Island specifically, Catalina now has the highest number of listed plant species in all of the Channel Islands. These are plants that don't occur anywhere else and should be valued by those visiting Catalina and more importantly those calling Catalina Island home. These plants are just one of the many aspects that make Catalina the gem it is. Endemic plant species of the islands do not have the same defenses that mainland plant species have and thus are more susceptible to harm.

The use of helicopters and wildlife biologists as hunters/sharpshooters has been proven **around the globe** to be the most humane and most effective way to remove non-native ungulates from landscapes. The company being hired for the removal on Catalina, is the same company that did the eradication of deer and elk on Santa Rosa Island. I had the privilege of working alongside them, and no one can do it better. They are trained wildlife biologists; they are not mercenaries as many are depicting them. Utilizing helicopters is the surest way to remove the animals in the most efficient and most humane way possible, which will ultimately cause the least disturbance for residents and visitors.

While I acknowledge change can be difficult and disruptive, I implore the residents of Catalina Island and the local mainland coast to envision a green Catalina Island that shimmers like an emerald on the horizon, rather than the mottled

One University Drive, Camarillo, California 93012-8599 Tel: (805) 437-2690 Fax: (805) 437-5717 www.csuci.edu

landscape it is currently. After the goats were removed, many people once in opposition begrudgingly acknowledged the island looked much healthier and that they didn't truly realize the damage that was being caused. This is another chance for everyone to help support the health of this struggling landscape, in a very tangible way and reap the rewards of the stunning beauty and magic that is currently being suppressed and irreparable damaged.

Good luck to the Catalina Island Conservancy in this effort to remove deer from Catalina Island. The island will thank you and many of your partners and neighbors are staunch supporters.

In solidarity,
Robyn

Robyn Shea
Lead Research Station Specialist, Santa Rosa Island Research Station
2022-24 Chair, Islands of the Californias Botanical Collaborative
2023 California Islands Symposium, Planning Committee

California State University Channel Islands
One University Drive
Bell Tower West 2245
Camarillo, CA 93012

September 29, 2025

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Re: Support the Catalina Island Restoration Project

Dear Director Bonham,

I am writing to express our organization's support for a healthy, climate resilient, and fire-resistant Catalina Island where humans and nature can thrive for years to come. Invasive species have had adverse impacts on the island for decades, and it is imperative to act now to halt and reverse the damage. Catalina Island is a special place for the many species who live on and visit the Island, with more than 60 endemic plant and animal species, 3,500 year-round residents, and a terrain that offers ample recreational opportunities for over one million annual visitors. The Catalina Island Restoration Project is critical to protect the biodiversity that will secure climate resilience for an important resource for communities across California to learn about and experience unique landscapes and species.

Catalina Island is a special place for me to recreate and enjoy time with my family. The preservation of the island for future generations is of paramount importance to me.

I support the Catalina Island Restoration Project because Catalina Island serves as a gateway to science, education, and nature for Catalina Island residents and visitors. We urge the California Department of Fish and Wildlife to support the Restoration Project. As the only large, publicly accessible island in Southern California, Catalina is an important entry point for millions of people in Southern California to connect with one of the richest island ecosystems in the world through hiking, camping, snorkeling, and much more. These visitors include thousands of youth per year who participate in overnight camps centered on outdoor science and adventures, creating a foundation for the next generation of environmental leaders and stewards. Catalina Island's unique wildlife and recreation opportunities generate millions in visitor-driven revenue, supporting the people living and working on the island, many of whom have called the Island home for generations.

Catalina Island's ecosystems as we know them are at risk. Without protective measures, many native and endemic species face extinction, and the Island may no longer be able to withstand climate change or support diverse ecosystems for years to come. The effects of disappearing species are already evident, as native chaparral habitats disappear and transition into invasive annual grasslands. Native plants on the Island absorb and retain water and are drought-resistant, acting as natural protection against wildfire and providing important habitat for native animal species. When these native plants are threatened by non-native wildlife and other risks, the Island is vulnerable to devastating climate threats such as wildfire and drought. A catastrophic wildfire is inevitable, such as the 2007 Island Fire, in which 10% of the Island burned and 700 residents and visitors were forced to evacuate. Droughts are similarly unavoidable and disastrous, such as the 2011-2017 drought on the Island, which caused wildlife to die of dehydration and starvation in large numbers and residents to rely on highly polluting desalination plants. Support for the Catalina Island Restoration Project will safeguard the Island from similar catastrophic impacts, lessening the damage to the Island and bolstering the Island's ability to recover.

The Catalina Island Conservancy is an exemplary steward of Island resources, successfully balancing conservation, education, and recreation. Their Catalina Island Restoration Project is a science-based, comprehensive plan to protect the Island's biodiversity, reduce erosion, prevent wildfires, and create a

sustainable environment where nature and humans will thrive for years to come. The implementation of the Restoration Project is urgent due to the heightened climate threats to the plant and animal species, residents, and ecosystems of the Island. Without the Restoration Project, communities across Southern California could lose access to one of the largest and most unique outdoor classrooms, thousands of residents could lose their homes, and the world could lose species found nowhere else on earth.

We thank you for your time and greatly look forward to working together to ensure that Catalina Island will be preserved for generations to come.

Best,

Roger Young
209 Calle del Sol
Avalon CA, 90704

Channel Islands
CALIFORNIA STATE UNIVERSITY
DIVISION OF ACADEMIC AFFAIRS

October 16, 2023

Dear Catalina Island Managers, Avalon City Council, and relevant elected officials,

My name is Russell Bradley and I have been the Director of the Santa Rosa Island Research Station for California State University Channel Islands since 2018. For the previous 18 years prior to that I worked on the Farallon Islands for Point Blue Conservation Science as an intern, biologist and 13-year Farallon Program Leader. I have spent well over 2000 days on California Islands. I have committed the majority of my adult life to the study and protection of these extraordinary places – and their globally significant resources.

I am writing today to express my support for removing deer from Catalina Island, using the suggested removal methodology - utilizing helicopters and hunting efforts. These methods have proven to be very effective in previous restoration efforts, including within Channel Islands National Park. I have seen firsthand the negative impacts of introduced mammal species on California's islands, as well as amazing ecosystem recovery after removals of ungulates in places like Santa Rosa Island. The rationale and justification behind this project is strong, and extensive planning efforts will thoroughly address wide ranging issues and concerns in a genuine and non-performative way.

I feel extremely fortunate to be so deeply and directly connected to these special places. I have witnessed with my own eyes, over many years, the incredible recoveries in island ecosystems after restoration actions. I understand the sensitivity and vulnerability of unique island habitats like Catalina and would never support a project I thought would cause long term harm. Catalina deer – introduced for the sole purpose of hunting - face extremely difficult lives with limited resources and removing these populations is the most humane course of action in the long term. Please know that people who have devoted their lives to California's islands will do everything in their power to ensure that this restoration effort, like those protections before it, will be successful and allow Catalina to thrive as a shining example of what Wild California can be.

Sincerely

Russell Bradley

Russell Bradley
Director, Santa Rosa Island Research Station
California State University Channel Islands
russell.bradley@csuci.edu

The Nature Conservancy
California Chapter Headquarters
830 S Street
Sacramento, CA 95811
Tel (916) 449-2850
Fax (916) 442-2377
nature.org

October 17, 2023

Letter of Support for the Catalina Island Conservancy's Catalina Island Restoration Project

To Whom It May Concern:

The Nature Conservancy (TNC) works in over 70 countries around the world to conserve the lands and waters upon which all life depends. In advance of that mission, TNC owns and manages a multitude of globally significant preserves, including 76% of Santa Cruz Island, the largest of the eight Channel Islands of California.

For decades, managers of the Channel Islands – including the Catalina Island Conservancy, the U.S. Navy, the U.S. National Park Service, and TNC – have worked to address the ecologically devastating consequences of livestock and game animals that were unfortunately introduced to the islands back before it was understood how unique and sensitive these island ecosystems are. In every case, managers reached the same conclusion: the only effective and sustainable way to stop the degradation caused by these animals, prevent extinction of native biodiversity, and ensure the islands will be resilient into the future is to remove those invasive populations.

For decades, the Catalina Island Conservancy (CIC) has analyzed the impacts of introduced mule deer on the island and worked to find ways of mitigating those impacts. Today, the evidence of the severity of the threat the deer pose is overwhelming. And the Conservancy has exhausted all other alternatives. Catalina Island can have either a functional, biodiverse and resilient ecosystem – or it can have deer. It cannot have both.

The CIC has engaged global leaders in large animal eradications and is developing a plan that will incorporate state-of-the-science best practices. These include making sure the project is designed and implemented to meet standards of humane dispatch of the animals, and to ensure the safety of the hunters and the public. In that regard, it is important to emphasize that the science and practice of eradication has been in very rapid development over the past few decades, and the increasing, integral use of helicopters has been transformative. They have made eradication efforts far more efficient, and have enabled conservationists to address a wider variety of devastating pest species, on ever larger and more complex islands. Helicopters are now commonly used in a variety of ways in eradication projects, from the transport of materials and personnel to the monitoring of eradication success.

One critical benefit of helicopters in eradication projects is the way they can improve safety for the eradication team. Island terrains are often remote and rugged, and helicopters can provide a safe means of accessing sites that would be otherwise impossible or dangerous to access. Another key benefit of helicopters is that they can enable a project to proceed more quickly, which can dramatically increase the likelihood of the project's success. Eradications can only succeed if they outpace reproduction of the target species. Completing an eradication quickly reduces replacement and therefore the number of individual animals that need to be dispatched. If a project fails, then animals will have died without a long-term conservation benefit.

Another critical – and perhaps counterintuitive – benefit of using helicopters in projects that require hunting large animals is how, with skilled professionals, the use of helicopters as an aerial hunting platform can increase the humaneness of the overall operation. Precision shooting is recognized by the American Veterinary Medical Association as meeting the standards of euthanasia for wildlife. Skilled, disciplined markspeople in helicopters can minimize the amount of time that an animal is aware it is being hunted, and with a precision shot, can greatly reduce the risk of stress and suffering, and wounding and escape. An exceptionally qualified team hunting from a helicopter can be a highly effective strategy for reducing risk and increasing efficiency of an eradication effort, and enabling a conservation manager to also achieve its animal welfare objectives in the effort.

Helicopter shooting is recognized globally as a methodological best practice in large animal eradication projects. There is a robust scientific literature documenting this.

Helicopters were used on a variety of successful, recent large animal eradication projects in the California Channel Islands, including very high-profile projects of the National Park Service and The Nature Conservancy. For example, aerial shooting was integral to the success of the feral pig eradication project on Santa Cruz Island in the mid-2000s. That project was one of the most rapid eradications of its kind. And upon its completion, managers were at last able to redirect their attention from managing an ecological crisis on the island to restoring and stewarding its extraordinary natural and cultural resources, many of which occur nowhere else on earth. With all the invasive introduced mammals removed from the island, the endemic, endangered island fox underwent the fastest recovery and delisting of any mammal in the history of the Endangered Species Act. Next month, managers will be celebrating the recovery and delisting of two soon-to-be-formerly threatened and endangered endemic plants. Eradication of invasive mammals works.

The Nature Conservancy joins conservationists across and beyond California in commending the Catalina Island Conservancy for its leadership is addressing this difficult and long-standing problem, and for the care they are putting into the planning so as to minimize impacts on the community. The dramatic and inspiring recovery of native plants and animals seen across all the other Channel Islands following removal of invasive herbivores affirms that this is the right – and necessary – thing to do.

Sincerely,

Scott A. Morrison, Ph.D.
Director of Conservation Programs
The Victor E. Shelford Director of Conservation Science
The Nature Conservancy, California

UNIVERSITY OF CALIFORNIA, DAVIS

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DEPARTMENT OF WILDLIFE, FISH, AND CONSERVATION BIOLOGY
COLLEGE OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES
AGRICULTURAL EXPERIMENT STATION
COOPERATIVE EXTENSION
FAX: (530) 752-4154

ONE SHIELDS AVENUE
DAVIS, CALIFORNIA 95616-8751

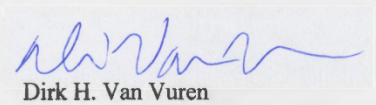
30 November 2023

Lauren Dennhardt
Catalina Island Conservancy
PO Box 2739
Avalon, CA 90704

Dear Dr. Dennhardt,

I am a professor at the University of California, Davis, and I have been doing research on introduced herbivores in island ecosystems for over 40 years. In my opinion, the removal of introduced mule deer from Santa Catalina Island is essential for sound management of island resources. The reason is the damage that introduced herbivores do, and especially in the context of the vulnerability of island species. Plants on islands like Santa Catalina evolved in the absence of herbivores, hence these plants tend to lose their defenses against herbivores. When exotic herbivores are introduced, the consequences are usually devastating, with wholesale destruction of plant communities. But the damage is not limited to plants; animals that depend on plants for habitat are also impacted. Some managers consider density reduction as a solution, instead of eradication. However, reducing deer density will not solve the problem because the plant community is already damaged, and reduced deer numbers will only maintain that damage; also, island plants lack defenses against even low densities of herbivores. Hence, complete removal of introduced mule deer is the only way to conserve island plants and the island vertebrates that depend on these plants for habitat.

Sincerely,



Dirk H. Van Vuren
Professor of Wildlife Biology

UCDAVIS
VETERINARY MEDICINE
Karen C. Drayer Wildlife Health Center

December 1, 2023

Subject: Support for Catalina Island Conservancy Restoration Plan and removal of deer from the island

To Whom It May Concern:

I am the Principal Investigator and co-Director of the University of California Davis Wildlife Health Center (UCD-WHC) California Carnivores Project. I have conducted research on mountain lions, Channel Island foxes, and multiple other mammalian and bird species in the region and throughout California – including extensive work on Catalina Island and the other Channel Islands and the Farallons. My work has been involved not only with the animal species but also with integrity of habitat that is critical to their survival.

Catalina Island, like most island ecosystems in the world, has been seriously impacted by the influence of humans and invasive animal and plant species that have accompanied them. I have seen the beneficial effects on multiple islands of removal of invasive species, especially larger mammals that have the power to disrupt the native plant and animal communities the most. Catalina has benefited greatly from past removals of goats and wild pigs, but the deer that are still present are exerting serious negative impacts on the ecosystem there that one can easily see.

I feel that the Catalina Island Conservancy is well positioned to complete the work that they are proposing, and that it deserves support to achieve the goals laid out in their Restoration Plan. I fully support their proposed deer removal plan as part of their overall Restoration Plan for the island.

Sincerely,

T. Winston Vickers, DVM, MPVM
Associate Research Veterinarian – UC Davis Wildlife Health Center, Co-Director California Carnivore Project
twvickers@ucdavis.edu
949-929-8643

UNIVERSITY OF CALIFORNIA, LOS ANGELES **UCLA**

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November 28, 2023

Support for Complete Removal of Mule Deer from Catalina Island

The Catalina Island Conservancy proposes to lethally remove introduced mule deer (*Odocoileus hemionus*) from Catalina Island as part of the larger Catalina Island Restoration Project. The deer were introduced as 3 individuals in 1928 — a buck and two does from Modoc County — followed by 19 animals from Los Angeles County in 1930–1932 (Longhurst et al. 1952). I support complete removal of the descendants of these 22 animals. In my position as an Adjunct Professor in the Institute of the Environment and Sustainability at UCLA, I am part of a team that is preparing specific restoration action plans to begin repairing the harm that has been done by the deer and other introduced herbivores over the decades.

Support for removal of the deer is based on several factors. No large mammalian herbivores are native to Catalina Island, meaning that the unique flora has evolved without pressure from such herbivores and is threatened and harmed by their presence. For example, experiments with deer exclosures shows that browsing dramatically reduces the size and vigor of the endemic, federally threatened island rush-rose (*Crocanthemum greenei*) (Dvorak et al. 2016). Researchers also found that seed production of the island rush-rose was greatly reduced when exposed to browsing by mule deer (Dvorak and Catalano 2016). Mule deer browsing furthermore reduces the size of seedlings emerging after fire, influencing vegetation structure (Jacobsen et al. 2018). These results are unsurprising, given that deer browsing in mainland environments is known to influence plant growth, reproduction, and survival (Côté et al. 2004), and island vegetation has evolved free from the pressure of this herbivory. On other Channel Islands, vegetation shows a rapid recovery following the removal of non-native herbivores, including, for example, mule deer and elk from Santa Rosa Island (Thomson et al. 2022). The scientific literature about islands in general (Donlan et al. 2003), the Channel Islands (McEachern et al. 2009, Thomson et al. 2022), and Catalina Island (Dvorak and Catalano 2016, Dvorak et al. 2016, Jacobsen et al. 2018) indicates that the best course of action from an ecological and biodiversity perspective is complete removal of mule deer.

The prospect of lethal removal of the Catalina Island mule deer population has received criticism, both from those describing it as an inhumane slaughter and from hunting interests

desiring continued recreational hunting and contending that hunting will be adequate to control the deer population. Neither of these arguments against removal is compelling.

The Catalina Island Conservancy proposes a rapid removal of all mule deer. Such an approach involves a range of aggressive but humane hunting techniques that will kill all the animals, estimated at 1,500–2,000, with limited further reproduction. If the deer were left, and recreational hunting continued, an average of 236 deer would be killed per year indefinitely. Those who find the removal plan to be an "inhumane slaughter" are in fact advocating that even more deer will be killed by similar means within 6 8 years and never stopping. In contrast, after the removal plan is implemented, there will be no further killing of deer on the island. As has been shown in successful removal programs on other Channel Islands (Parkes et al. 2010) and around the world, rapid removal of all individuals is the most humane way forward and minimizes the number of animal deaths.

Some hunting advocacy groups also oppose the plan, for the transparent reason that the recreational hunting opportunity would be ended. The harvest rates from recreational hunting (averaging 236 per year) are, however, too low to reduce the population, given the focus of hunters on bucks rather than does, the logistical limits on accessing much of the island as a recreational hunter, even with a guide, and the expense (Stapp et al. 2022). To even start to control the population, hunters would have to kill two to three times as many deer each year indefinitely (only antlerless; see comparable research on white-tailed deer in Simard et al. 2013) to achieve far less benefit for the environment and its unique endemic species than complete removal.

Although contraception has been effective with bison on Catalina Island (Duncan et al. 2013), contraception of a herd of 1,500–2,000 deer would be impractical (Stapp et al. 2022) and would cause far more stress on animals than rapid lethal removal. Individually identified deer would have to be caught and injected by hand or darted from close range in all terrain across the island (Green 2022). Such a program is not feasible. To quote a recent review of the use of contraception to control deer populations, "… the delivery of the immunocontraceptive to free-living park deer in sufficient numbers with accurate identification of individual animals is currently impossible" (Green 2022).

The island conservation research and management community in California and around the world has developed significant experience in efficiently and humanely removing exotic herbivores from islands. Catalina Island's native birds and other wildlife would benefit substantially from recovery of native vegetation that would become possible with the removal of the introduced deer herd. It is time to take this step toward ecological restoration of Catalina Island.

Travis Longcore, Ph.D.
Adjunct Professor

Disclaimer: *This statement is by the author as an individual; the statements are his own and do not represent a position taken by the University of California, UCLA, or the Institute of the Environment and Sustainability. The UCLA name is used to establish the author's experience and qualifications pursuant to UCLA Policy 110.*

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stratton@ccber.ucsb.edu

November 29th, 2023

Regarding: Supporting Catalina Island Restoration Project

To CDFW and Concerned Community Members;

I am writing as a former Catalina Island Conservancy Restoration Ecologist in support of the proposed deer removal project. I resided on Catalina from 1997 to 2005 and implemented restoration trials on the island to establish a diversity of techniques to bring back native flora impacted by deer and invasive plants. One of the primary threats to recovery that we documented was the impact of deer on plant regeneration. Extensive funding and time and effort were and continue to be spent establishing tall fences to exclude deer from rare mountain mahogany habitats and from a variety of chaparral, coastal sage and oak woodland habitat areas and restoration projects.

Over the many years that goats and deer and bison were present together on the island the Island Scrub Oak (*Quercus pacifica*) basal sprouts were repeatedly browsed and over time a phenomenon was observed whereby large areas of the scrub oak woodland were dying out. This is apparently the result of the stems losing hydraulic function at a certain age and the fact that the re-growth strategy of establishing new stems in this scrub oak was thwarted by repeated browsing over nearly 100 years such that this keystone species' underground lignotubor was completely depleted of resources and could no longer regenerate and the whole tree died. There are patches of this oak dieback documented across the island and reflect a system-wide collapse created by the historical impacts of goats and current and ongoing impact of deer.

Many restoration trials reflected impacts from deer and the fact that these island plants are unique, endemic and evolved without browsing and grazing pressure together makes it clear that deer need to be removed to preserve the unique flora and associated fauna on the island. The island's ecosystems are collapsing to support a species of animal that is ubiquitous elsewhere and was only introduced to the island for the sport of hunting and for no ecological function. Clearly current hunting levels and interest are insufficient to manage the impacts to our nation's unique biota. Hunters can find many opportunities elsewhere to hunt, but our nation's people can find the unique plants and animals of Catalina nowhere else but on the island. It is crucial that this proposed restoration plan be supported by all. By quickly

removing the animals the least amount of animal suffering will occur compared to years of hunting.

Sincerely

Lisa Stratton, Ph.D.
Director of Ecosystem Management
Cheadle Center for Biodiversity and Ecological Restoration (CCBER)
UC Santa Barbara, 93106-9615

United States Department of the Interior
U.S. FISH AND WILDLIFE SERVICE

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2177 Salk Avenue, Suite 250
Carlsbad, California 92008

Ecological Services
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

In Reply Refer to:
L&R 2023 10-001

October 27, 2023
Sent Electronically

Lauren Dennhardt
Senior Director of Conservation
Catalina Island Conservancy
P.O. Box 2739
Avalon, California 90704

Subject: Support for the Catalina Island Restoration Project

Dear Lauren Dennhardt:

The U.S. Fish and Wildlife Service (Service) is writing to express support for projects to restore native habitats and manage threats to listed species, including the Catalina Island Restoration Project.

As the landowner and manager of 88 percent of Catalina Island, the efforts of the Catalina Island Conservancy are critical to conserve the island's unique fauna and flora. The Catalina Island Restoration Project has three pillars: (1) habitat restoration to combat soil erosion, minimize wildfire risk, and conserve species and ecosystems; (2) plant restoration by propagating and reintroducing native plants; and (3) nonnative species management to remove deer and invasive plant species (Catalina Island Conservancy 2023, p. 1).

We anticipate that this project will support recovery of four federally listed plants (Table 1) and enhance habitat for other plant and animal species found only on Catalina Island. Introduced nonnative herbivores threaten rare plants by direct herbivory and habitat degradation and soil erosion (Service 2000, pp. 43, 69; 2019, pp. 6–8; 2021, p. 3). To eliminate these threats and recover ecosystems, we have recommended nonnative herbivore control on all of California's Channel Islands (Service 2000, p. 69; 2019, p. 8).

Nonnative herbivore removal has already contributed to the recovery of federally listed species on two of the California Channel Islands. On San Clemente Island, the removal of nonnative herbivores (goats, sheep, pigs, cattle, and mule deer) led to vegetation and listed plant recovery, resulting in our 2023 delisting of four plant species and one bird (Service 2023, p. 4761). Similarly, on Santa Cruz Island, the removal of sheep and feral pigs—and subsequent soil and vegetation recovery—contributed to our 2022 proposed rule to delist two plant species (Service 2022, pp. 73724, 73730). Therefore, the removal of nonnative herbivores from California's islands conserves and enhances rare plant populations and their habitats.

We look forward to continuing our partnership with the Catalina Island Conservancy to conserve the endemic flora and fauna of Catalina Island for future generations. If you have any questions regarding this letter, please contact Service biologist Mary Crawford[1] of the Carlsbad Fish and Wildlife Office.

Sincerely,

Stephen P. Henry
Field Supervisor
Ventura Fish and Wildlife Office

Scott Sobiech
Field Supervisor
Carlsbad Fish and Wildlife Office

cc:
Tim Dillingham,[2] CDFW
Christian Romberger,[3] CDFW

[1] mary_crawford@fws.gov.
[2] Tim.Dillingham@wildlife.ca.gov.
[3] Christian.Romberger@wildlife.ca.gov.

Table 1. Federally Listed Plant Species on Catalina Island.

Scientific Name	Common Name	Federal Status
Crocanthemum (=*Helianthemum*) *greenei*	Island rush-rose	Threatened
Pentachaeta lyonii	Lyon's pentachaeta	Endangered
Sibara filifolia	Santa Cruz Island rockcress	Endangered
Cercocarpus traskiae	Catalina Island mountain-mahogany	Endangered

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Wildlands Conservation Science, LLC
P.O. Box 1846
Lompoc, CA 93438
805-680-8643

22 December 2023

Subject: Santa Catalina Island Restoration Project

To Whom It May Concern:

Wildlands Conservation Science (WCS) is a small business dedicated to effective wildlands stewardship and endangered species management using innovative methods of landscape-level vegetation and wildlife monitoring, invasive species control and habitat restoration. Much of our work utilizes low-flying helicopters as a platform to achieve these goals. This specialty has given us the opportunity to work on and gain a comprehensive understanding of all eight of the California Channel Islands. Our background gives us a unique, comparative perspective that underlines our ardent support for Santa Catalina Island's proposed restoration project.

WCS is a descendant of Native Range Inc., a New Zealand company that specializes in ungulate removal projects throughout the world. This is the same organization that effectively removed 5,036 feral pigs and the last feral sheep from Santa Cruz Island in the mid-2000s and teamed with White Buffalo, Inc. to remove all introduced Kaibab mule deer and Roosevelt elk from Santa Rosa Island in 2011. WCS has experienced first-hand the solemn professionalism and level-headedness that these pilots and hunters bring to their work.

After successful completion of the Santa Cruz and Santa Rosa Island ungulate removals, WCS was brought in to fly every square foot of both islands using the very same Native Range pilots that had just completed the eradication efforts. Our combined goal was now one of documentation. From the air, WCS mapped the extent of rare plant populations and invasive weed infestations to serve as a baseline for habitat conditions following this first meaningful step toward island-wide restoration. These flights have been repeated in the years following the initial assessments. If we were to describe our observations in a single word, it would be revival.

In the two short years following the removal of deer and elk from Santa Rosa Island, once bare canyon slopes that perpetually slumped into dry washes began to stabilize around verdant streams now lined with willows and wetland vegetation. Eight years following the removal of the last pig from Santa Cruz Island, the federally endangered island bedstraw (*Galium buxifolium*) was documented escaping from the sheer sea cliffs where it had only been known to occur. Without the grazing pressure from sheep and ground disturbance from pigs, island bedstraw was able to reclaim its rightful place on the gentle slopes of the open marine terraces. Its recovery was so substantial, island bedstraw and the now aptly named Santa Cruz Island liveforever (*Dudleya nesiotica*) were just removed from the endangered species list on the eve of the 50th anniversary of the Endangered Species Act. The same story is repeated to the south of Catalina, where four federally protected plant

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species and one bird have been deemed fully recovered after the removal of goats from San Clemente Island.

The restoration of these once imperiled species may seem trivial to some. One might ask, "who cares about a couple plants that no one has ever heard of?" But these are more than inconsequential organisms brought back from the brink of extinction. They are more than just canaries in a coal mine. They are testament that on a rare occasion, humanity can do right by the natural world. Even when the means to achieve that goal feels painfully unjust to ALL PEOPLE. Nobody wants to cause broad-scale loss of life, especially not the biologist saddled with the heady responsibility of preventing extinction. None of the dedicated biologists at the Catalina Island Conservancy would choose this path out of simple expediency. These people see beyond the sensational newspaper headlines and endure death threats and alienation from their local community because they are trying to rebuild something that most haven't realized they've almost lost, a delicate insular ecosystem unlike any place on Earth.

The last northern white rhino was seen walking the open plains of central Africa in 2006. Today, only two rhinos are left, both living out their remaining days in captivity. The same situation currently exists on the Channel Islands. However, in this instance, it's not some charismatic creature left in a cage to while away its days until the end comes for its kind. In this scenario, a small number of cages euphemistically referred to as "deer exclosures" have been erected around tiny pieces of what the whole of Catalina Island should be — a species-diverse, drought- and flood-resistant, carbon-storing ecosystem that increases the land's resiliency and ability to support all life.

It's an unfortunate fact that the presence of mule deer on Catalina Island has relegated the native biodiversity to protective confinement. But like the rhino, the problem can't be solved by simply opening the cage doors. To meet an enduring objective, hard decisions must be made and the needs of an island ecosystem must be considered.

We would like to leave you with a snapshot perspective of what can come from choosing the difficult path. Below are two images of Santa Cruz Island separated by a span of 45 years. On that island, hard decisions were made by deliberate and well-intended people to end the lives of beautiful creatures. Those actions have allowed the land to heal and go on to support so much more.

In support,

Morgan Ball, Executive Director
morgan@wildlandscs.org

Katrina Olthof, Conservation Program Manager
katrina@wildlandscs.org

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January 21, 2025

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Sent via email to: Chuck.Bonham@wildlife.ca.gov, cc to: Tim.Dillingham@wildlife.ca.gov

Re: Support for the Catalina Island Restoration Project

Dear Director Bonham:

As a biologist with many years of experience in the Los Angeles area environmental field, I am writing to express my support for a healthy, climate resilient, and fire-resistant Catalina Island where humans and nature can thrive for years to come. Invasive species have had adverse impacts on the island for decades, and it is imperative to act now to halt and reverse the damage. Catalina Island is a special place for the many species who live on and visit the Island, with more than 60 endemic plant and animal species, 3,500 year-round residents, and a terrain that offers ample recreational opportunities for over one million annual visitors. The Catalina Island Restoration Project is critical to protect the biodiversity that will secure climate resilience for an important resource for communities across California to learn about and experience unique landscapes and species.

In my graduate studies and beyond, I have studied and seen firsthand the devastating effects of invasive species on native species and ecosystems. One of the species I studied, the invasive red swamp crayfish, is unfortunately impossible to remove from invaded streams and the only tactic is to reduce its populations to give endangered and sensitive species a chance. Reducing crayfish populations entails significant time, energy, and a never-ending commitment. Islands, while uniquely vulnerable, also offer a beacon of hope where invasive species removal can actually be successful since there are clear physical boundaries and re-introduction is not a concern. Using a scientific approach, the chance for success is high for the Catalina Island Restoration Project and the long-term benefits will be significant for public and environmental health.

I support the Catalina Island Restoration Project because Catalina Island serves as a gateway to science, education, and nature for Catalina Island residents and visitors. I urge the California Department of Fish and Wildlife to support the Restoration Project. As the only accessible island in Southern California, Catalina is an important entry point for millions of people in Southern California to connect with one of the richest island ecosystems in the world through hiking, camping, snorkeling, and much more. These visitors include thousands of youth per year who participate in overnight camps centered on outdoor science and adventures, creating a foundation for the next generation of environmental leaders and stewards. Catalina Island's unique wildlife and recreation opportunities generate millions in visitor-driven revenue, supporting the people living and working on the island, many of whom have called the Island home for generations.

Catalina Island's ecosystems as we know them are at risk. Without protective measures, many native and endemic species face extinction, and the Island may no longer be able to withstand climate change or support diverse ecosystems for years to come. The effects of disappearing species are already evident, as native chaparral habitats disappear and transition into invasive annual grasslands. Native plants on the Island absorb and retain water and are drought-resistant, acting as natural protection against wildfire and providing important habitat for native animal species. When these native plants are threatened by non-native wildlife and other risks, the Island is vulnerable to devastating climate threats such as wildfire and drought. A catastrophic wildfire is inevitable, such as the 2007 Island Fire, in which 10% of the Island

burned and 700 residents and visitors were forced to evacuate. Droughts are similarly unavoidable and disastrous, such as the 2011-2017 drought on the Island, which caused wildlife to die of dehydration and starvation in large numbers and residents to rely on highly polluting desalination plants. Support for the Catalina Island Restoration Project will safeguard the Island from similar catastrophic impacts, lessening the damage to the Island and bolstering the Island's ability to recover.

The Catalina Island Conservancy is an exemplary steward of Island resources, successfully balancing conservation, education, and recreation. Their Catalina Island Restoration Project is a science-based, comprehensive plan to protect the Island's biodiversity, reduce erosion, prevent wildfires, and create a sustainable environment where nature and humans will thrive for years to come. The implementation of the Restoration Project is urgent due to the heightened climate threats to the plant and animal species, residents, and ecosystems of the Island. Without the Restoration Project, communities across Southern California could lose access to one of the largest and most unique outdoor classrooms, thousands of residents could lose their homes, and the world could lose species found nowhere else on earth.

I thank you for your time and greatly look forward to working together to ensure that Catalina Island will be preserved for generations to come.

Sincerely,

Katherine M. Pease

Katherine Pease, PhD

February 24, 2025

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Dear Mr. Bonham,

On behalf of the Conservation Corps of Long Beach (CCLB), I am writing to express our organization's support for a healthy, climate resilient, and fire-resistant Catalina Island where humans and nature can thrive for years to come. Invasive species have had adverse impacts on the island for decades, and it is imperative to act now to halt and reverse the damage. Catalina Island is a special place for the many species who live on and visit the Island, with more than 60 endemic plant and animal species, 3,500 year-round residents, and a terrain that offers ample recreational opportunities for over one million annual visitors. The Catalina Island Restoration Project is critical as it addresses key components of biodiversity conservation, habitat restoration, economic impacts, educational opportunities, and to maintain the Island's cultural history and significance.

CCLB has been working closely with the Catalina Island Conservancy for many years focusing on the workforce development of young adults ages 18-26. Corpsmembers working on Catalina Island are typically involved in a variety of environmental conservation and restoration tasks that contribute significantly to the preservation and improvement of the Island's natural resources. Their work often includes invasive species removal that helps to restore the balance of the ecosystem, trail maintenance that ensures safe and sustainable access for tourists and researchers while minimizing environmental impact, reforestation projects that are crucial for preventing soil erosion, maintaining water quality, and supporting wildlife habitats, erosion control which can be particularly important in maintaining healthy soil conditions and preventing landslides on the island, and much more. Through work like this, our partnership provides hands-on work that contributes to the immediate health of the Island's ecosystem and provides valuable skills and experiences for Corpsmembers themselves, fostering a deeper understanding and commitment to environmental stewardship.

The Conservation Corps of Long Beach supports the Catalina Island Restoration Project because Catalina Island serves as a gateway to science, education, and nature for Catalina Island residents and visitors. We urge the California Department of Fish and Wildlife to support the Restoration Project.

Catalina Island's ecosystems as we know them are at risk. Without protective measures, many native and endemic species face extinction, and the Island may no longer be able to withstand climate change or support diverse ecosystems for years to come. The effects of disappearing species are already evident, as native chaparral habitats disappear and transition into invasive annual grasslands. Native plants on the Island absorb and retain water and are drought-resistant, acting as natural protection against wildfire and

providing important habitat for native animal species. When these native plants are threatened by non-native wildlife and other risks, the Island is vulnerable to devastating climate threats such as wildfire and drought. A catastrophic wildfire is inevitable, such as the 2007 Island Fire, in which 10% of the Island burned and 700 residents and visitors were forced to evacuate. Droughts are similarly unavoidable and disastrous, such as the 2011-2017 drought on the Island, which caused wildlife to die of dehydration and starvation in large numbers and residents to rely on highly polluting desalination plants. Support for the Catalina Island Restoration Project will safeguard the Island from similar catastrophic impacts, lessening the damage to the Island and bolstering the Island's ability to recover.

The Catalina Island Conservancy is an exemplary steward of Island resources, successfully balancing conservation, education, and recreation. Their Catalina Island Restoration Project is a science-based, comprehensive plan to protect the Island's biodiversity, reduce erosion, prevent wildfires, and create a sustainable environment where nature and humans will thrive for years to come. The implementation of the Restoration Project is urgent due to the heightened climate threats to the plant and animal species, residents, and ecosystems of the Island. Without the Restoration Project, communities across Southern California could lose access to one of the largest and most unique outdoor classrooms, thousands of residents could lose their homes, and the world could lose species found nowhere else on earth.

We thank you for your time and look forward to working together to ensure that Catalina Island will be preserved for generations to come.

Best,

Dan Knapp

Dan Knapp
Executive Director & CEO

HUTTOPIA

February 8, 2025,

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Re: Support the Catalina Island Restoration Project

Dear Director Bonham,

On behalf of Huttopia North America Operations inc. (''Huttopia'') I am writing to express our organization's support for a healthy, climate resilient, and fire-resistant Catalina Island where humans and nature can thrive for years to come. Invasive species have had adverse impacts on the island for decades, and it is imperative to act now to halt and reverse the damage. Catalina Island is a special place for the many species who live on and visit the Island, with more than 60 endemic plant and animal species, 3,500 year-round residents, and a terrain that offers ample recreational opportunities for over one million annual visitors. The Catalina Island Restoration Project is critical to protect the biodiversity that will secure climate resilience for an important resource for communities across California to learn about and experience unique landscapes and species.

Catalina Island holds a special place in Huttopia's vision, as nature conservation is deeply embedded in our DNA. Our guests choose our destinations for the opportunity to connect with pristine natural landscapes, and Catalina is a rare gem that embodies this experience. Its unique biodiversity, breathtaking scenery, and rich outdoor recreation opportunities make it an invaluable destination for eco-conscious travelers. Supporting the restoration of Catalina is essential to us, not only to preserve its ecological integrity but also to ensure that future generations can continue to experience the island's wild beauty in a responsible way.

Huttopia supports the Catalina Island Restoration Project because Catalina Island serves as a gateway to science, education, and nature for Catalina Island residents and visitors. We urge the California Department of Fish and Wildlife to support the Restoration Project. As the only accessible island in Southern California, Catalina is an important entry point for millions of people in Southern California to connect with one of the richest island ecosystems in the world through hiking, camping, snorkeling, and much more. These visitors include thousands of youths per year who participate in overnight camps centered on outdoor science and adventures, creating a foundation for the next generation of environmental leaders and stewards. Catalina Island's unique wildlife and recreation opportunities generate millions in visitor-driven revenue, supporting the people living and working on the island, many of whom have called the Island home for generations.

Catalina Island's ecosystems as we know them are at risk. Without protective measures, many native and endemic species face extinction, and the Island may no longer be able to withstand climate change or support diverse ecosystems for years to come. The effects of disappearing species are already evident, as native chaparral habitats disappear and transition into invasive annual grasslands. Native plants on the Island absorb and retain water and are drought-resistant, acting as natural protection against wildfire and providing important habitat for native animal species. When these native plants are threatened by non-native wildlife and other risks, the Island is vulnerable to devastating climate threats such as wildfire and drought. A catastrophic wildfire is inevitable, such as the 2007 Island Fire, in which 10% of the Island burned and 700 residents and visitors were forced to evacuate. Droughts are similarly unavoidable and disastrous, such as the 2011-2017 drought on the Island, which caused wildlife to die of dehydration and starvation in large numbers and residents to rely on highly polluting desalination plants. Support for the

HUTTOPIA

Catalina Island Restoration Project will safeguard the Island from similar catastrophic impacts, lessening the damage to the Island and bolstering the Island's ability to recover.

The Catalina Island Conservancy is an exemplary steward of Island resources, successfully balancing conservation, education, and recreation. Their Catalina Island Restoration Project is a science-based, comprehensive plan to protect the Island's biodiversity, reduce erosion, prevent wildfires, and create a sustainable environment where nature and humans will thrive for years to come. The implementation of the Restoration Project is urgent due to the heightened climate threats to the plant and animal species, residents, and ecosystems of the Island. Without the Restoration Project, communities across Southern California could lose access to one of the largest and most unique outdoor classrooms, thousands of residents could lose their homes, and the world could lose species found nowhere else on earth.

We thank you for your time and greatly look forward to working together to ensure that Catalina Island will be preserved for generations to come.

Best,

Antoine Renaudet, Executive Vice President and COO

LA CONSERVATION CORPS
Transforming Youth. Enhancing Communities.

Mailing Address
P.O. Box 861658, Los Angeles, CA 90086-1658

December 5, 2024

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Re: Support the Catalina Island Restoration Project

Dear Director Bonham,

On behalf of the LA Conservation Corps (The Corps), I am writing to express our organization's support for a healthy, climate resilient, and fire-resistant Catalina Island where humans and nature can thrive for years to come. Invasive species have had adverse impacts on the island for decades, and it is imperative to act now to halt and reverse the damage. Catalina Island is a special place for the many species who live on and visit the Island, with more than 60 endemic plant and animal species, 3,500 year-round residents, and a terrain that offers ample recreational opportunities for over one million annual visitors. The Catalina Island Restoration Project is critical to protect the biodiversity that will secure climate resilience for an important resource for communities across California to learn about and experience unique landscapes and species.

Catalina is a great example of a place that allows humans to interact in a healthy way with the environment, something that we strive to build here in Los Angeles. We have also had the opportunity to send our crews of Corpsmembers to Catalina to work on various restoration projects that help maintain this healthy environment and ecosystem for years to come.

The Corps supports the Catalina Island Restoration Project because Catalina Island serves as a gateway to science, education, and nature for Catalina Island residents and visitors. We urge the California Department of Fish and Wildlife to support the Restoration Project. As the only accessible island in Southern California, Catalina is an important entry point for millions of people in Southern California to connect with one of the richest island ecosystems in the world through hiking, camping, snorkeling, and much more. These visitors include thousands of youth per year who participate in overnight camps centered on outdoor science and adventures, creating a foundation for the next generation of environmental leaders and stewards. Catalina Island's unique wildlife and recreation opportunities generate millions in visitor-driven revenue, supporting the people living and working on the island, many of whom have called the Island home for generations.

Catalina Island's ecosystems as we know them are at risk. Without protective measures, many native and endemic species face extinction, and the Island may no longer be able to withstand climate change or support diverse ecosystems for years to come. The effects of disappearing species are already evident, as native chaparral habitats disappear and transition into invasive annual grasslands. Native plants on the Island absorb and retain water and are drought-resistant, acting as natural protection against wildfire and providing important habitat for native animal species. When these native plants are threatened by non-native wildlife and other risks, the Island is vulnerable to devastating climate threats

such as wildfire and drought. A catastrophic wildfire is inevitable, such as the 2007 Island Fire, in which 10% of the Island burned and 700 residents and visitors were forced to evacuate. Droughts are similarly unavoidable and disastrous, such as the 2011-2017 drought on the Island, which caused wildlife to die of dehydration and starvation in large numbers and residents to rely on highly polluting desalination plants. Support for the Catalina Island Restoration Project will safeguard the Island from similar catastrophic impacts, lessening the damage to the Island and bolstering the Island's ability to recover.

The Catalina Island Conservancy is an exemplary steward of Island resources, successfully balancing conservation, education, and recreation. Their Catalina Island Restoration Project is a science-based, comprehensive plan to protect the Island's biodiversity, reduce erosion, prevent wildfires, and create a sustainable environment where nature and humans will thrive for years to come. The implementation of the Restoration Project is urgent due to the heightened climate threats to the plant and animal species, residents, and ecosystems of the Island. Without the Restoration Project, communities across Southern California could lose access to one of the largest and most unique outdoor classrooms, thousands of residents could lose their homes, and the world could lose species found nowhere else on earth.

We thank you for your time and greatly look forward to working together to ensure that Catalina Island will be preserved for generations to come.

Best,

Signed by:
Wendy Butts
3430E70CC0CD419...

Wendy Butts
Chief Executive Officer

LOS ANGELES NEIGHBORHOOD LAND TRUST

January 21, 2025

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street Sacramento, CA 95814

Re: Support the Catalina Island Restoration Project

Dear Director Bonham,

On behalf of the Los Angeles Neighborhood Land Trust (LANLT), I am writing to express our strong support for fostering a healthy, climate-resilient, and fire-resistant Catalina Island — one where both people and nature can flourish for generations to come. The Catalina Island Restoration Project is essential for safeguarding biodiversity and preserving an invaluable resource where communities across California can explore and learn from the Island's unique landscapes and species.

Catalina Island serves as a prime example of the importance of fostering community resilience through equitable access to green spaces, aligning closely with LANLT's mission. Since 2002, LANLT has added 22 acres of green space to Los Angeles through community-driven development. The Catalina Island Restoration Project embodies the balance of conservation, education, and equitable access to nature that we strive to achieve. Thousands of youth benefit annually from outdoor science camps on the Island, where they develop a foundation for environmental stewardship and leadership.

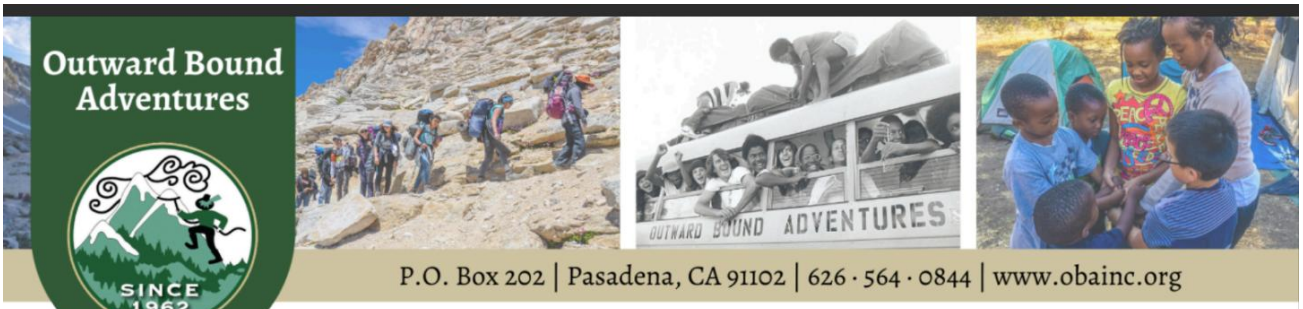
Without protective measures, many native and endemic species are at risk of extinction, and the Island's ability to withstand climate change will be severely diminished. The effects of disappearing species are already evident, as native chaparral habitats are replaced by invasive grasslands. This loss increases the Island's vulnerability to drought and wildfire, as evidenced by past disasters such as the 2007 Island Fire and the severe drought of 2011–2017. These events underscored the importance of resilient native ecosystems that act as natural safeguards against climate threats.

The Catalina Island Conservancy's science-based Restoration Project is a comprehensive plan that aligns with LANLT's commitment to creating green spaces that support both nature and human well-being. The Project will safeguard biodiversity, reduce erosion, prevent wildfires, and create a sustainable environment where ecosystems can thrive. Without its implementation, Southern California risks losing a treasured outdoor classroom, invaluable biodiversity, and the livelihoods of Island residents.

We urge the California Department of Fish and Wildlife to support the Catalina Island Restoration Project. Together, we can ensure that Catalina Island remains a sanctuary for biodiversity, a source of education and inspiration for communities, and a resilient ecosystem that stands strong against climate threats.

Sincerely,

Tori Kjer
Executive Director
Los Angeles Neighborhood Land Trust



2/13/2025

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Re: Support the Catalina Island Restoration Project

Dear Director Bonham,

On behalf of Outward Bound Adventures (OBA), I am writing to express our organization's support for a healthy, climate resilient, and fire-resistant Catalina Island where humans and nature can thrive for years to come. Invasive species have had adverse impacts on the island for decades, and it is imperative to act now to halt and reverse the damage. Catalina Island is a special place for the many species who live on and visit the Island, with more than 60 endemic plant and animal species, 3,500 year-round residents, and a terrain that offers ample recreational opportunities for over one million annual visitors. The Catalina Island Restoration Project is critical to protect the biodiversity that will secure climate resilience for an important resource for communities across California to learn about and experience unique landscapes and species.

[Catalina Island has been an instrumental and foundational location for Outward Bound Adventures (OBA) trips, providing transformative experiences that have served as a catalyst for launching students into the fields of restoration and conservation. As the nation's longest-running nonprofit dedicated to engaging low-income, urban BIPOC youth and adults through environmental education, leadership development, and conservation workforce programs, OBA has empowered over 95,000 participants since its founding in 1962. These immersive experiences on Catalina have not only deepened participants' connections to the natural world but have also equipped them with the knowledge and skills to become environmental stewards. The island's rich biodiversity and unique ecological challenges have made it an invaluable outdoor classroom, seamlessly woven into OBA's history and mission to inspire the next generation of conservation leaders.]

Outward Bound Adventures supports the Catalina Island Restoration Project because Catalina Island serves as a gateway to science, education, and nature for Catalina Island residents and visitors. We urge the California Department of Fish and Wildlife to support the Restoration Project. As the only accessible island in Southern California, Catalina is an important entry point for millions of people in Southern California to connect with one of the richest island ecosystems in the world through hiking, camping, snorkeling, and much more. These visitors include thousands of youth per year who participate in overnight camps centered on outdoor science and adventures, creating a foundation for the next generation of environmental leaders and stewards. Catalina Island's unique wildlife and recreation opportunities generate millions in visitor-driven revenue, supporting the people living and working on the island, many of whom have called the Island home for generations.

Catalina Island's ecosystems as we know them are at risk. Without protective measures, many native and endemic species face extinction, and the Island may no longer be able to withstand climate change or support diverse ecosystems for years to come. The effects of disappearing species are already evident, as native chaparral habitats disappear and transition into invasive annual grasslands. Native plants on the Island absorb and retain water and are drought-resistant, acting as natural protection against wildfire and providing important habitat for native animal species. When these native plants are threatened by non-native wildlife and other risks, the Island is vulnerable to devastating climate threats such as wildfire and drought. A catastrophic wildfire is inevitable, such as the 2007 Island Fire, in which 10% of the Island burned and 700 residents and visitors were forced to evacuate. Droughts are similarly unavoidable and disastrous, such as the 2011-2017 drought on the Island, which caused wildlife to die of dehydration and starvation in large numbers and residents to rely on highly polluting desalination plants. Support for the Catalina Island Restoration Project will safeguard the Island from similar catastrophic impacts, lessening the damage to the Island and bolstering the Island's ability to recover.

The Catalina Island Conservancy is an exemplary steward of Island resources, successfully balancing conservation, education, and recreation. Their Catalina Island Restoration Project is a science-based, comprehensive plan to protect the Island's biodiversity, reduce erosion, prevent wildfires, and create a sustainable environment where nature and humans will thrive for years to come. The implementation of the Restoration Project is urgent due to the heightened climate threats to the plant and animal species, residents, and ecosystems of the Island. Without the Restoration Project, communities across Southern California could lose access to one of the largest and most unique outdoor classrooms, thousands of residents could lose their homes, and the world could lose species found nowhere else on earth.

We thank you for your time and greatly look forward to working together to ensure that Catalina Island will be preserved for generations to come.

Best,

Charles Thomas
Executive Director
Outward Bound Adventures

February 12, 2025

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Re: Support the Catalina Island Restoration Project

Dear Director Bonham,

I am writing to express my support for a healthy, climate resilient, and fire-resistant Catalina Island where humans and nature can thrive for years to come. Invasive species have had adverse impacts on the island for decades, and it is imperative to act now to halt and reverse the damage. Catalina Island is a special place for the many species who live on and visit the Island, with more than 60 endemic plant and animal species, 3,500 year-round residents, and a terrain that offers ample recreational opportunities for over one million annual visitors. The Catalina Island Restoration Project is critical to protect the biodiversity that will secure climate resilience for an important resource for communities across California to learn about and experience unique landscapes and species.

As a parent of a third grader in the Los Angeles Unified School District, my child talks almost every week about how excited he is to go to Catalina Island when he's in fifth grade. We're excited to sign him up for summer camps on the Island in the nearer term. For the past five years, we have loved going camping on the Channel Islands and seeing the endemic species there like the jays and foxes, and have so appreciated the notable efforts to reduce invasive and non-native species there like eucalyptus. We would love to see Catalina Island be able to enact the same kinds of restoration programming that have already successfully kicked off at other Channel Islands. The extraordinary and unique species that call Catalina Island home deserve to thrive. Additionally, we have just born witness to terrible, catastrophic fires in Los Angeles, and know how important it is to restore fire-resistant native habitats and be able to remove highly flammable brush and non-native grasses from the Island.

I support the Catalina Island Restoration Project because Catalina Island serves as a gateway to science, education, and nature for Catalina Island residents and visitors. I urge the California Department of Fish and Wildlife to support the Restoration Project. As the only accessible island in Southern California, Catalina is an important entry point for millions of people in Southern California to connect with one of the richest island ecosystems in the world through hiking, camping, snorkeling, and much more. These visitors include thousands of youth per year who participate in overnight camps centered on outdoor science and adventures, creating a foundation for the next generation of environmental leaders and stewards. Catalina Island's unique wildlife and recreation opportunities generate millions in visitor-driven revenue, supporting the people living and working on the island, many of whom have called the Island home for generations.

Catalina Island's ecosystems as we know them are at risk. Without protective measures, many native and endemic species face extinction, and the Island may no longer be able to withstand climate change or support diverse ecosystems for years to come. The effects of disappearing species are already evident, as native chaparral habitats disappear and transition into invasive

annual grasslands. Native plants on the Island absorb and retain water and are drought-resistant, acting as natural protection against wildfire and providing important habitat for native animal species. When these native plants are threatened by non-native wildlife and other risks, the Island is vulnerable to devastating climate threats such as wildfire and drought. A catastrophic wildfire is inevitable, such as the 2007 Island Fire, in which 10% of the Island burned and 700 residents and visitors were forced to evacuate. Droughts are similarly unavoidable and disastrous, such as the 2011-2017 drought on the Island, which caused wildlife to die of dehydration and starvation in large numbers and residents to rely on highly polluting desalination plants. Support for the Catalina Island Restoration Project will safeguard the Island from similar catastrophic impacts, lessening the damage to the Island and bolstering the Island's ability to recover.

The Catalina Island Conservancy is an exemplary steward of Island resources, successfully balancing conservation, education, and recreation. Their Catalina Island Restoration Project is a science-based, comprehensive plan to protect the Island's biodiversity, reduce erosion, prevent wildfires, and create a sustainable environment where nature and humans will thrive for years to come. The implementation of the Restoration Project is urgent due to the heightened climate threats to the plant and animal species, residents, and ecosystems of the Island. Without the Restoration Project, communities across Southern California could lose access to one of the largest and most unique outdoor classrooms, thousands of residents could lose their homes, and the world could lose species found nowhere else on earth.

Thank you for your time and greatly look forward to working together to ensure that Catalina Island will be preserved for generations to come.

Best,

Lauren Ahkiam
Parent, Los Angeles

April 9, 2025

Director Charlton "Chuck" Bonham
California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Via Email: Director@wildlife.ca.gov; Chuck.Bonham@wildlife.ca.gov

RE: Support for the Catalina Island Restoration Project and Fire Resilience Efforts

Dear Director Bonham,

I am writing as a fifth generation Californian, a business owner and dedicated conservationist. I am writing to request your support for the Catalina Island Restoration Project - an essential conservation initiative designed to protect the long-term health and resilience of Catalina Island by creating an environment in which highly flammable invasive grasses are replaced with more fire resilient native plants.

For generations, Catalina has been an ecological and recreational treasure, home to diverse wildlife, rare plant species, and a community that depends on a thriving natural environment. However, the increasing frequency of extreme wildfires has made clear the urgent need for proactive restoration and fire mitigation efforts. The Catalina Island Restoration Project is designed to address these challenges by restoring native habitats, reducing highly flammable invasive vegetation, and strengthening the island's natural defenses against wildfire and other environmental threats.

This project, which is privately funded through generous donations, is not only about protecting Catalina's landscapes—it is about safeguarding the people who live, work, and visit here, ensuring a resilient future for the island's ecosystem and economy. During the recent fires that ravaged Los Angeles County, Catalina was under the same Red Flag warning. Fortunately, the island did not experience the same fate as the mainland. But it did come close when the 2007 Island Fire almost claimed the City of Avalon - a situation we must work to ensure never happens again.

I do hope you recognize the significance of this project and the urgency moving forward. Lending your voice of support will help ensure the goals of the project are fulfilled and the island remains healthy and resilient for future generations to come.

Thank you for your time, your consideration, and for your dedication to protecting one of California's greatest natural resources.

Sincerely,

Terry Grill

cc: Whitney Latorre, President and CEO, Catalina Island Conservancy
Kirsten Peterson Johansen, Chief of External Affairs, Catalina Island Conservancy

Anthony Michaels

April 7, 2025

Director Charlton "Chuck" Bonham
California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Via Email: Director@wildlife.ca.gov; Chuck.Bonham@wildlife.ca.gov

RE: Support for the Catalina Island Restoration Project and Fire Resilience Efforts

Dear Director Bonham,

I am writing to request your support for the Catalina Island Restoration Project - an essential conservation initiative designed to protect the long-term health and resilience of Catalina Island by creating an environment in which highly flammable invasive grasses are replaced with more fire resilient native plants.

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I do hope you recognize the significance of this project and the urgency moving forward. Lending your voice of support will help ensure the goals of the project are fulfilled and the island remains healthy and resilient for future generations to come.

Thank you for your time, your consideration, and for your dedication to protecting one of California's greatest natural resources.

Sincerely,

Anthony F. Michaels

cc: Whitney Latorre, President and CEO, Catalina Island Conservancy
Kirsten Peterson Johansen, Chief of External Affairs, Catalina Island Conservancy

2625 Via Rivera, Palos Verdes Estates, CA 90274 | 310-990-7641 | tony.michaels.renew@gmail.com

February 6, 2025

SGMRC

SAN GABRIEL MOUNTAINS
REGIONAL CONSERVANCY

Mr. Charlton Bonham

Director, California Department of Fish and Wildlife

715 P St.

Sacramento, CA 95814

Dear Mr. Bonham,

I am writing to express my unwavering support for the Catalina Island Restoration Project, and Scientistic Collection Permit for the eradication of invasive mule deer which aims to preserve and enhance the natural ecosystem of this unique and treasured island. This initiative is crucial for maintaining biodiversity, protecting endangered species, and ensuring the longevity of Catalina Island's natural beauty for future generations.

The Catalina Island Restoration Project represents a collaborative effort based on the expertise of their scientists and partners in conservation. By implementing science-based strategies and sustainable practices, this project will address critical environmental challenges such as habitat degradation, invasive species, restoration/preservation of native flora and climate change impacts.

Our organization, the San Gabriel Mountains Regional Conservancy, has long been committed to environmental preservation and sustainable land management. We believe that the success of the Catalina Island Restoration Project will serve as a model for similar conservation efforts across California and beyond.

Sincerely,

Jackie Doornik

Jackie Doornik

Co-President San Gabriel Mountains Regional Conservancy 501c3

PO Box 963

Glendora, CA 91740

CATALINA ISLAND CONSERVANCY

February 28, 2025

Dear Director Bonham,

As Chair of the Benefactors and Chair of the Board of Directors, respectively, of the Catalina Island Conservancy, we are sharing our strong support for the Catalina Island Restoration Project and its vital importance to the safety and future resilience of Catalina.

This initiative represents a critical step toward ensuring the long-term health and viability of the Island, particularly as we face growing threats from wildfire, invasive species, and climate change.

For generations, Catalina has been an ecological, cultural and recreational treasure, home to diverse wildlife, rare plant species and a community that depends on a thriving natural environment. However, the increasing frequency of extreme wildfires has made clear the urgent need for proactive restoration and fire mitigation efforts. The Catalina Island Restoration Project is designed to address these challenges by restoring native habitats, reducing highly flammable invasive vegetation and strengthening the Island's natural defenses against wildfire and other environmental threats.

This project is not only about protecting Catalina's landscapes—it is about safeguarding the people who live, work and visit here, ensuring a resilient future for the Island's ecosystem and economy. We are committed to working with the State to advance this plan, and we hope you recognize its significance, will support our efforts, and authorize our permit.

Thank you for your time and for your dedication to protecting California's natural resources. We look forward to keeping you updated on our progress and working together to preserve Catalina Island for future generations.

Sincerely,

Signed by:
Alison Wrigley Rusack
7AD555CB5E8D475...

Alison Wrigley Rusack
Chair, Benefactors

Terry Grill
Chair, Board of Directors

cc: Whitney Latorre, President and CEO
Kirsten Peterson Johansen, Chief of External Affairs

Avalon Office
P.O. Box 2739
Avalon, CA 90704
310-510-2595 x0

Long Beach Office
320 Golden Shore, Suite 220
Long Beach, CA 90802
562-437-8555

CATALINA
ISLAND COMPANY

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

March 24, 2025

Re: Support the Catalina Island Restoration Project

Dear Director Bonham:

On behalf of Catalina Island Company (Island Company), I am writing to express our support for the Catalina Island Restoration Project (CIRP).

Our parent corporation, the 'Santa Catalina Island Company' was founded in 1894 and, for over 80 years, owned almost the entire island. Both before and during that time, we learned about ecological devastation that can occur from certain non-native species, including invasive plants and animals. Then, in 1972, with the help of members of the Wrigley family, we created the Santa Catalina Island Conservancy and, in 1975, deeded over 88% of the island to that special non-profit organization. (The company kept its land in Avalon and Two Harbors, along with some other island parcels.) The hope and dream of the Island Company was that the Conservancy would advance the stewardship of this incredible undeveloped land in the best ways that science and land management could provide.

Our belief is that the Conservancy's CIRP is, in fact, based on the best research and science available and builds on the restoration results of other channel islands. Those studies and efforts have shown that the CIRP is critical not only to protect the native biodiversity of Catalina Island but also to expand it in the most beneficial ways possible.

Aside from believing in and supporting the Conservancy's restoration efforts, the Island Company and many other businesses, as well as hundreds of thousands of individuals, will directly benefit from the CIRP. The company itself owns over 10% of the island. Our team (often over 500 people) live and work here. We rely on the Conservancy and its land for eco-tourism, access to our various properties, fire prevention and more. In addition, the CIRP will better enable our tour guides to tell the story of Catalina's incredible biodiversity and its restoration – including that the CIRP will help secure climate and fire resilience. The CIRP will also be a significant resource for

PO Box 737 150 Metropole Avenue Avalon CA 90704
VisitCatalinaIsland.com

communities across California to learn about and experience unique landscapes and species.

All in all, we at the Catalina Island Company believe that the CIRP is one of the most exciting ecological programs not only for Catalina Conservancy and for the island itself, but for the entire world. We look forward to seeing what it will do for the beauty, biodiversity and ecological resilience of the Conservancy's lands and we can't wait to educate our many visitors about this amazing project as we share with them the treasure that is Santa Catalina Island.

Very Truly Yours,

Geoffrey Claflin Rusack
President and Chief Executive Officer

Cc: Whitney Latorre
Terry Grill

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL® Company

Jill C. Anderson
Executive Vice President
& Chief Operating Officer

March 3, 2025

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Re: Support for the Catalina Island Restoration Project

Dear Director Bonham,

On behalf of Southern California Edison (SCE), I am writing to express our strong support for the Catalina Island Restoration Project. As the electric, water and gas utility service provider to Catalina Island, SCE recognizes the urgent need to protect its unique ecosystems, ensuring long-term resilience against climate change, wildfire risks, and biodiversity loss.

Invasive species have severely impacted Catalina's native habitats, threatening its 60+ endemic species and increasing the risk of devastating wildfires and drought. The loss of native chaparral to invasive grasses reduces the island's ability to retain water and resist fire, endangering both residents and infrastructure.

Catalina is Southern California's only large, publicly accessible island, attracting over a million visitors annually for recreation, education, and nature-based tourism. It serves as an outdoor classroom for thousands of students each year, fostering the next generation of environmental stewards. Preserving the island's biodiversity is not only crucial for conservation but also vital to the local economy and the well-being of its residents.

The Catalina Island Conservancy's science-based restoration plan offers a proactive approach to reversing habitat degradation, reducing wildfire risks, and ensuring a sustainable future. SCE urges the California Department of Fish and Wildlife to support this critical initiative. Investing in Catalina's restoration today will protect its ecosystems, safeguard its communities, and preserve an invaluable natural resource for all Californians.

Thank you for your time and consideration. We look forward to working together to protect Catalina Island for generations to come.

Best regards,

Jill C. Anderson

Jill C. Anderson

USC Viterbi
School of Engineering

March 30, 2025

Charlton Bonham, Director
California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Dear Director Bonham

I am writing to express my support for the Catalina Island restoration plan. What we are trying to do is not a novel idea. This action has been taken on hundreds of islands around the globe including every other island along the California coast. The science supports the action pending before the CA Fish and Wildlife Service. Unfortunately, the 2024 hunting season did not have the results we all would have hoped for.

The economy of the island is based on tourism. The non-profit Catalina Island Conservancy is essentially responsible for the livelihood and the **lives** of the 4000 people that live on the islands. Can you imagine the impacts if we have a fire like the recent ones experienced in Los Angeles County? We can't make a more fire-resilience island without the help of your agency. The time to act is now.

Sincerely,
Geraldine Knatz
Geraldine Knatz, Ph. D.

University of Southern California
1234 Trousdale Parkway, Los Angeles, California 90089-1234 • Tel: 213 740 1234 • Fax: 213 740 1234

February 28, 2025

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Re: Support the Catalina Island Restoration Project

Dear Director Bonham,

I am a concern Catalina Island resident begging you to support the Catalina Island Conservancy's efforts to eradicate the island**'s i**nvasive species namely the mule deer that impact our restoration efforts. It's discouraging that our endangered plants and animals are surviving only because of volunteer and staff efforts to errect and maintain protective refuges:

Volunteers building an exclosure at Little Harbor

Contrast resuting from exclosure on Stage Coarch Road

Deer predation invites the growth of non-native fire-prone grasses which prevent the growth of water-retaining plants native to the island. This system of exclosures is an unsustainable solution to our restoration efforts to prevent desertification.

The inevitable droughts create inhumane conditions for deer that suffer starvation and disease. Their deplorable condition is a reminder that they do not belong on Catalina.

Deer in town. Photo by David N. Young

Fields of coreopsis used to grace most of Catalina Island. Because it is a prefered deer fodder, these plants are found only in the exclosures and on inaccessible cliffs. This photo of Santa Cruz Island shows a field of coreopis, the result of the U.S. Fish and Wildlife Service support of that restoration project. It's remarkable what deer removal acheived:

Scorpion Rock, on Santa Cruz Island, is an active restoration site. The first photo (left) is pre-restoration in 2007 the second photo (right) is from 2015 after active restoration. The plant in center of first photo is single giant coreopsis (*Leptosyne gigantea*) in a sea of dried iceplant. It has become one of the dominant plants since restoration efforts began. Photos by David Mazurkiewicz.

Every year thousands of youth participate in overnight camps centered on outdoor science and adventures, creating a foundation for the next generation of environmental leaders and stewards. Even more thousands of visitors have access to the educational programs and volunteer opportunities to embrace this nature-rich land. Catalina Island Restoration could be the exemplary conservation model for the world.

The CDFW approval is urgent due to the heightened climatic threats to the plant and animal species and ecosystems of the Island. The Catalina Island Conservancy employs some of the nation's most skilled scientists and educators to reveal to the world what a great restoration project should look like. I strongly urge the CDFW to support their efforts.

Sincerely,

Patricia McCormick

PO Box 673
Avalon, CA 90704
georgesandpatricia@mac.com

January 28, 2025

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Re: Support the Permit for the Catalina Island Restoration Project

Dear Director Bonham,

On behalf of the National Parks Conservation Association (NPCA), I am writing to express our organization's support for the Catalina Island Conservancy's efforts to secure the requisite state permit to ensure a healthy, climate resilient, and fire-resistant Catalina Island where humans and nature can thrive for years to come. Invasive species have had adverse impacts on the island for decades, and it is imperative to act now to halt and reverse the damage. The presence of mule deer on the Island disrupts the Island's ecosystem balance and sustainability, increasing the risk of wildfires that threaten Island residents, biodiversity, and infrastructure. Catalina is a special place for the many species who live on and visit the Island, with over 60 endemic plant and animal species, 3,500 year-round residents, and a terrain that offers ample recreational opportunities for over a million annual visitors. The Catalina Island Restoration Project is critical to protecting the biodiversity that will secure climate resilience for an important resource for communities across Southern California to learn about and experience unique landscapes and species.

NPCA is very familiar with island ecosystem restoration activities in California, and perspectives of stakeholders. At the nearby Channel Islands National Park, the NPCA worked to protect Santa Rosa Island from non-native elk and deer that were harming endangered species and their habitat. The restoration required the National Park Service to remove the non-native elk and deer using aerial culling, the same scientifically supported, most humane method that is being proposed at Catalina Island.

During the past 30 years, the removal of non-native species from Channel Islands National Park has helped ensure the survival and recovery of imperiled and native species. At its most fundamental level, human intervention for the benefit of natural ecosystems raises issues of not only science and ecology, but philosophy and ethics. The issues are seldom, if ever, black and white. As Dr. Adrian M. Wenner, Professor Emeritus in the Department of Ecology, Evolution, and Marine Biology at UCSB wrote in response to opposition to feral pig eradication efforts on Santa Cruz Island:

> "As a biologist, I have had extensive experience on the island and can report firsthand about the pig situation there. Feral pigs on the island number in the thousands. In good years, they reproduce to their full ability and soon exceed their food source. As they run out of easily obtainable food, such as acorns, they desperately plow up the ground in search of bulbs, roots and tubers, leaving the soil open to being washed away in future rains; and thereby exterminating native plants. They then eat non-nourishing grass as they starve. During the 1988 and 1989 droughts, for example,

> perhaps nine-tenths of the pigs died of starvation. But pigs don't starve immediately; as the weaker ones succumb, they get attacked and eaten by stronger pigs. At those times we could hear the squeals of pigs in such fights. By the end of 1989, nearly every pig I encountered was nothing more than a bag of bones that could hardly move. When they noticed us, they most often fell over as they tried to move. Even in good years feral pigs suffer. Last week we grabbed a piglet for examination. Dozens of blacklegged ticks -- vectors of Lyme disease, fleas and lice lived on its soft underside. Island feral pigs, when they overpopulate, cannot migrate to greener pastures; they starve. Is it more humane to let these feral pigs continue their overpopulation, starvation and cannibalism or eliminate a few thousand from the island now, before untold thousands die in the future during such cycles?"

NPCA supports the Conservancy's permit application for the eradication of the invasive mule deer as part of the Catalina Island Restoration Project because Catalina Island is a gateway to science, education, and nature for Catalina Island residents and visitors. We urge the California Department of Fish and Wildlife to support the permit. As the only accessible island in Southern California, Catalina is an important entry point for millions of people in Southern California to connect with one of the richest island ecosystems in the world through hiking, camping, snorkeling, and much more. These visitors include thousands of youth per year who participate in overnight camps centered on outdoor science and adventures, creating a foundation for the next generation of environmental leaders and stewards. Catalina Island's unique wildlife and recreation opportunities generate millions in visitor-driven revenue, supporting the people living and working on the island, many of whom have been there for generations.

Catalina Island's ecosystems as we know them are at risk. Without protective measures, many native and endemic species face extinction, and the Island may no longer be able to withstand climate change or support diverse ecosystems for years to come. The effects of disappearing species are already evident, as native chaparral habitats disappear and transition into invasive annual grasslands. Native flora on the island absorb and retain water and are drought-resistant, acting as natural protection against wildfire and providing important habitat for native animal species. When these native plants are threatened by non-native wildlife, namely the mule deer, the Island is vulnerable to succumbing to devastating climate threats such as wildfire and drought. A catastrophic wildfire is inevitable, such as the 2007 Island Fire, in which 10% of the Island burned and 700 residents and visitors were forced to evacuate. Droughts are similarly unavoidable and disastrous, such as the 2011-2017 drought on the Island, which caused wildlife to die of dehydration and starvation in large numbers and residents to rely on highly polluting desalination plants. Support for the Catalina Island Restoration Project will safeguard the Island from similar catastrophic impacts, lessening the damage to the Island and bolstering the Island's ability to recover.

Invasive species are one of the greatest threats to biodiversity worldwide. Removal of invasive species is imperative to preserving biodiversity and to reaching the state's goal of conserving 30% of lands and coastal waters by 2030. Eradicating the mule deer is a vital and foundational component of the Restoration Project, and will enable the ecosystem to recover from overgrazing and trampling. Studies have shown that aerial hunting, as proposed in the permit, is the most humane and effective method of deer removal, minimizing stress levels of deer significantly more than translocation and birth control. Despite Catalina Island having the longest recreational hunting season in the state, the mule deer population continues to grow unchecked, indicating that recreational hunting alone is not a viable method of controlling mule deer population.

The Catalina Island Conservancy is an exemplary steward of Island resources, successfully balancing conservation, education, and recreation. Their Catalina Island Restoration Project is a science-based, comprehensive plan to protect the Island's biodiversity, reduce erosion, prevent wildfires, and create a sustainable environment where nature and humans will thrive for years to come. The implementation of the Restoration Project is urgent given the heightened climate threats to the species, people, and ecosystems of the land. Without the Restoration Project, communities across Southern California could lose access to one

of the most unique outdoor classrooms in the region, thousands of residents could lose their homes, and the world could lose species found nowhere else on earth.

We thank you for your time and greatly look forward to working together to ensure that Catalina Island will be preserved for generations to come.

Sincerely,

Neal Desai

Neal Desai
Senior Director, Pacific Region
National Parks Conservation Association

COASTAL CORRIDOR ALLIANCE

January 22, 2025

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Re: Support the Catalina Island Restoration Project

Dear Director Bonham,

On behalf of the Coastal Corridor Alliance I am writing to express our organization's support for the Catalina Island Restoration Project. Invasive species have adversely impacted the island for decades, and it is imperative to act to reverse the damage. Catalina Island is a special place for the many species who live on and visit the Island. With more than 60 endemic plant and animal species, 3,500 year-round residents, and a terrain that offers ample recreational opportunities for over one million annual visitors, this Restoration Project is critical. It will help protect the biodiversity that will secure climate resilience for this wonderful and unique landscape.

Similar to the island, properties we have worked to preserve sit along the Southern California coast. From providing habitat for nesting shorebirds to perches for osprey high above the landscape, it is vital to take actionable steps while funding is available to support restoration of native ecosystems.

As you know, the Island's ecosystems are at risk. Without protective measures, many native and endemic species face extinction, and the Island may no longer be able to withstand climate change. The effects of disappearing species are already evident, as native chaparral habitats transition into invasive annual grasslands. Native plants on the Island absorb and retain water and are drought-resistant, acting as natural protection against wildfire while providing important habitat for native animal species. Without them, catastrophic wildfire is

P.O. Box 15333 • Newport Beach, CA 92659 • (949) 216-0880 • CoastalCorridor.org

inevitable, such as the 2007 Island Fire, in which 10% of the Island burned and 700 residents and visitors were forced to evacuate.

We support the Catalina Island Restoration Project to safeguard the Island from more catastrophic impacts and bolster the Island's ability to recover.

Sincerely,

Terry M. Welsh, MD
President

Victoria Dean
866 Toulon Drive, Pacific Palisades, CA 90272
vsdean4@gmail.com

11 April 2025

Director Charlton "Chuck" Bonham
California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Via Email: Director@wildlife.ca.gov; Chuck.Bonham@wildlife.ca.gov

RE: Support for the Catalina Island Restoration Project and Fire Resilience Efforts

Dear Director Bonham,

I am writing to request your support for the Catalina Island Restoration Project - an essential conservation initiative designed to protect the long-term health and resilience of Catalina Island by restoring the native habitat, which is resilient to fire, with native trees, shrubs and plants and so, eliminating the existing highly flammable invasive grasses.

For generations, Catalina has been a recreational destination as well as the ecological home to unique and rare plants and animals. The threat of more frequent and the possibility of extreme wildfires in California has made it clear that there is an urgent need for proactive restoration which will improve fire mitigation on the Island. The Catalina Island Restoration Project will address these threats by restoring native habitats to strengthen the island's natural defenses against wildfire and other environmental threats.

This project, which is funded through private donations, is not only about protecting Catalina's landscapes and ecosystems but also, about safeguarding the people who live, work, and visit here. During the recent fires that ravaged Los Angeles County, Catalina was under the same Red Flag warning. Although the Island did not burn this time, the 2007 Island Fire burned almost a quarter of the Island and nearly claimed the City of Avalon - a threat we hope to prevent.

I do hope you recognize the significance of this project and the urgency to act on the Catalina Island Restoration Plan now. Lending your voice of support will help us achieve the goals of the project which is to create a healthy and resilient Catalina now and for future generations.

Thank you for your time and consideration and hope you will support the restoration of one of California's valuable resources.

Sincerely,

cc: Whitney Latorre, President and CEO, Catalina Island Conservancy
Kirsten Peterson Johansen, Chief of External Affairs, Catalina Island Conservancy

STATE CAPITOL
P.O. BOX 942849
SACRAMENTO, CA 94249-0069
(916) 319-2069
FAX (916) 319-2169

Assembly
California Legislature

JOSH LOWENTHAL
ASSEMBLYMEMBER, SIXTY-NINTH DISTRICT

March 26, 2025

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Re: Support the Catalina Island Restoration Project

Dear Director Bonham,

On behalf of the California 69th Assembly District, I write to express my support for a healthy, climate resilient, and fire-resistant Catalina Island where humans and nature can thrive for years to come. Invasive species have had adverse impacts on the island for decades, and it is imperative to act now to halt and reverse the damage. Catalina Island is a special place for the many species who live on and visit the Island, with more than 60 endemic plant and animal species, 3,500 year-round residents, and a terrain that offers ample recreational opportunities for over one million annual visitors. The Catalina Island Restoration Project is critical to protect the biodiversity that will secure climate resilience for an important resource for communities across California to learn about and experience unique landscapes and species.

Without protective measures, many native and endemic species face extinction, and the Island may no longer be able to withstand climate change or support diverse ecosystems for years to come. Native plants on the Island absorb and retain water and are drought-resistant, acting as natural protection against wildfire and providing important habitat for native animal species. When these native plants are threatened by non-native wildlife and other risks, the Island is vulnerable to devastating climate threats such as wildfire and drought. Support for the Catalina Island Restoration Project will safeguard the Island from similar catastrophic impacts, lessening the damage to the Island and bolstering the Island's ability to recover.

The Catalina Island Restoration Project is a science-based, comprehensive plan to protect the Island's biodiversity, reduce erosion, prevent wildfires, and create a sustainable environment where nature and humans will thrive for years to come. The implementation of the Restoration Project is urgent due to the heightened climate threats.

We thank you for your time and greatly look forward to working together to ensure that Catalina Island will be preserved for generations to come.

Sincerely,

JOSH LOWENTHAL
Assemblymember, 69th District

UNIVERSITY OF CALIFORNIA

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OFFICE OF THE PROVOST AND
EXECUTIVE VICE PRESIDENT FOR ACADEMIC AFFAIRS

NATURAL RESERVE SYSTEM

OFFICE OF THE PRESIDENT
1111 Franklin Street, 12th Floor
Oakland, California 94607-5200

June 18, 2025

RE: Letter of Support for the Catalina Island Restoration Project

To: Whom It May Concern:

I am writing to express support for the Catalina Island Restoration Project proposed by the Catalina Island Conservancy (Conservancy). As a system of 42 reserves, the UC Natural Reserve System has a long history of mitigating the impact of invasive species across its 50,000 acres of managed lands.

The mule deer population on Catalina Island far exceeds the ecosystems' carrying capacity. This has resulted in devastating adverse impacts on biodiversity and ecosystem function on the island, including the loss of native vegetation, increased soil erosion, and reduced water capture. In addition, mule deer overabundance can lead to animal suffering, starvation, and increased disease risks—issues that cannot be successfully mitigated with interventions such as fencing, recreational hunting, the introduction of predators, translocation, or reproductive management.

The Conservancy has consulted widely with global experts, exploring all available options for mitigating the destructive impacts of mule deer on the Island. The proposed lethal removal of non-native mule deer using skilled shooters deployed from helicopters is a long-used, humane method for extirpating invasive species, as experience shows with its successful application on Santa Cruz and Santa Rosa Islands. After removal of mule deer, the Conservancy will implement a comprehensive land restoration plan that will help bring island ecosystem back into balance, making it more resilient in the face of climate threats such as wildfire and drought.

I fully support the Conservancy as they seek to address this is a very challenging situation by undertaking the lethal removal of mule deer, which is the only truly effective solution for addressing the ecosystem degradation caused by these animals.

Sincerely,

Steven L. Monfort, DVM, PhD
Executive Director, UC Natural Reserve System

COMMITTEE ON THE JUDICIARY

APPROPRIATIONS COMMITTEE
EX-OFFICIO MEMBER

WEB ADDRESS AT:
www.schiff.house.gov

FACEBOOK:
www.facebook.com/repadamschiff

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DISTRICT OFFICE:
☐ 5500 HOLLYWOOD BOULEVARD
LOS ANGELES, CA 90028
(323) 315-5555
(BY APPOINTMENT ONLY)

November 26, 2024

Charlton Bonham, Director
California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Re: Support for the Catalina Island Restoration Project

Dear Director Bonham:

I am writing to you today in support of the *Catalina Island Restoration Project*, which will work to address and mitigate the ongoing effects of climate change on the diverse fauna and flora of Catalina Island. Catalina is a popular destination for Southern California residents to enjoy our natural environment, and its preservation is critical to ensure that future generations have access to our region's natural resources.

Currently, Catalina Island is facing two critical challenges brought about by mule deer and other invasive species. Over the past decade, the trampling of the native drought-resistant flora has led to a 150% average increase in the island's fire risk. Unfortunately, this also comes with a debilitating pattern of drought that only serves to perpetuate the increasing risk of fires and further natural deterioration.

The *Catalina Island Restoration Project* directly addresses these concerns with pointed, strategic measures to combat soil erosion, preserve endangered species, humanely and systematically remove invasive species, and rebuild a healthy native ecosystem.

The success of this initiative is likely to benefit the island for decades to come and inspire further restoration efforts across California. I urge you to give full and fair consideration to support this project.

Sincerely,

ADAM B. SCHIFF
Member of Congress

December 10, 2024

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Re: Support the Catalina Island Restoration Project

Dear Director Bonham,

On behalf of SLATE-Z, I am writing to express our organization's support for a healthy, climate resilient, and fire-resistant Catalina Island where humans and nature can thrive for years to come. Invasive species have had adverse impacts on the island for decades, and it is imperative to act now to halt and reverse the damage. Catalina Island is a special place for the many species who live on and visit the Island, with more than 60 endemic plant and animal species, 3,500 year-round residents, and a terrain that offers ample recreational opportunities for over one million annual visitors. The Catalina Island Restoration Project is critical to protect the biodiversity that will secure climate resilience for an important resource for communities across California to learn about and experience unique landscapes and species.

As the backbone entity to the South LA Promise Zone, SLATE-Z follows five levers of change: education, jobs, small business and entrepreneurship, transit, and public safety. The Catalina Island Restoration Project emulates these levers, with its emphasis on educational opportunities for youth and providing protection to the island's residents, both human and wildlife.

SLATE-Z supports the Catalina Island Restoration Project because Catalina Island serves as a gateway to science, education, and nature for Catalina Island residents and visitors. We urge the California Department of Fish and Wildlife to support the Restoration Project. As the only accessible island in Southern California, Catalina is an important entry point for millions of people in Southern California to connect with one of the richest island ecosystems in the world through hiking, camping, snorkeling, and much more. These visitors include thousands of youth per year who participate in overnight camps centered on outdoor science and adventures, creating a foundation for the next generation of environmental leaders and stewards. Catalina Island's unique wildlife and recreation opportunities generate millions in visitor-driven revenue, supporting the people living and working on the island, many of whom have called the Island home for generations.

Catalina Island's ecosystems as we know them are at risk. Without protective measures, many native and endemic species face extinction, and the Island may no longer be able to withstand climate change or support diverse ecosystems for years to come. The effects of disappearing species are already evident, as native chaparral habitats disappear and transition into invasive annual grasslands. Native plants on the Island absorb and retain water and are drought-resistant, acting as natural protection against wildfire and providing important habitat for native animal species. When these native plants are threatened by non-native wildlife and other risks, the Island is vulnerable to devastating climate threats such as wildfire and drought. A catastrophic wildfire is inevitable, such as the 2007 Island Fire, in which 10% of the Island burned and 700 residents and visitors were forced to evacuate. Droughts are similarly unavoidable and disastrous, such as the 2011-2017 drought on the Island, which caused wildlife to die of dehydration and starvation in large numbers and residents to rely on highly polluting desalination plants. Support for the Catalina Island Restoration Project will safeguard the Island from similar catastrophic impacts, lessening the damage to the Island and bolstering the Island's ability to recover.

The Catalina Island Conservancy is an exemplary steward of Island resources, successfully balancing conservation, education, and recreation. Their Catalina Island Restoration Project is a science-based, comprehensive plan to protect the Island's biodiversity, reduce erosion, prevent wildfires, and create a

sustainable environment where nature and humans will thrive for years to come. The implementation of the Restoration Project is urgent due to the heightened climate threats to the plant and animal species, residents, and ecosystems of the Island. Without the Restoration Project, communities across Southern California could lose access to one of the largest and most unique outdoor classrooms, thousands of residents could lose their homes, and the world could lose species found nowhere else on earth.

We thank you for your time and greatly look forward to working together to ensure that Catalina Island will be preserved for generations to come.

Best,

Manny Sanchez
Deputy Director

17 December 2024

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Re: Support the Catalina Island Restoration Project

Dear Director Bonham,

On behalf of the Ventura Land Trust, I am writing to express our organization's support for a healthy, climate resilient, and fire-resistant Catalina Island where humans and nature can thrive for years to come. Invasive species have had adverse impacts on the island for decades, and it is imperative to act now to halt and reverse the damage. Catalina Island is a special place for the many species who live on and visit the Island, with more than 60 endemic plant and animal species, 3,500 year-round residents, and a terrain that offers ample recreational opportunities for over one million annual visitors. The Catalina Island Restoration Project is critical to protect the biodiversity that will secure climate resilience for an important resource for communities across California to learn about and experience unique landscapes and species.

As part of the "Galapagos of North America", Catalina Island is profoundly special, requiring the science-based, bold management outlined in this restoration project that supports its unique ecology and highly specialized endemic species. My organization also manages extensive acreage of biodiverse wildlands, and I know how vital it is to support ecological function through invasive species management. Invasive species are considered the most significant threat to biodiversity after habitat loss and are pivotal in affecting both public safety and local economies. From a conservation perspective, it is absolutely vital to address invasive species threats in such a geographically limited, biologically exceptional protected area.

Ventura Land Trust supports the Catalina Island Restoration Project because Catalina Island serves as a gateway to science, education, and nature for Catalina Island residents and visitors. We urge the California Department of Fish and Wildlife to support the Restoration Project. As the only accessible island in Southern California, Catalina is an important entry point for millions of people in Southern California to connect with one of the richest island ecosystems in the world through hiking, camping, snorkeling, and much more. These visitors include thousands of youth per year who participate in overnight camps centered on outdoor science and adventures, creating a foundation for the next generation

of environmental leaders and stewards. Catalina Island's unique wildlife and recreation opportunities generate millions in visitor-driven revenue, supporting the people living and working on the island, many of whom have called the Island home for generations.

Catalina Island's ecosystems as we know them are at risk. Without protective measures, many native and endemic species face extinction, and the Island may no longer be able to withstand climate change or support diverse ecosystems for years to come. The effects of disappearing species are already evident, as native chaparral habitats disappear and transition into invasive annual grasslands. Native plants on the Island absorb and retain water and are drought-resistant, acting as natural protection against wildfire and providing important habitat for native animal species. When these native plants are threatened by non-native wildlife and other risks, the Island is vulnerable to devastating climate threats such as wildfire and drought. A catastrophic wildfire is inevitable, such as the 2007 Island Fire, in which 10% of the Island burned and 700 residents and visitors were forced to evacuate. Droughts are similarly unavoidable and disastrous, such as the 2011-2017 drought on the Island, which caused wildlife to die of dehydration and starvation in large numbers and residents to rely on highly polluting desalination plants. Support for the Catalina Island Restoration Project will safeguard the Island from similar catastrophic impacts, lessening the damage to the Island and bolstering the Island's ability to recover.

The Catalina Island Conservancy is an exemplary steward of Island resources, successfully balancing conservation, education, and recreation. Their Catalina Island Restoration Project is a science-based, comprehensive plan to protect the Island's biodiversity, reduce erosion, prevent wildfires, and create a sustainable environment where nature and humans will thrive for years to come. The implementation of the Restoration Project is urgent due to the heightened climate threats to the plant and animal species, residents, and ecosystems of the Island. Without the Restoration Project, communities across Southern California could lose access to one of the largest and most unique outdoor classrooms, thousands of residents could lose their homes, and the world could lose species found nowhere else on earth.

I urge you to support this excellent opportunity to meaningfully protect the unique ecological resources on Catalina Island.

Sincerely,

Daniel Hulst
Deputy Director, Ventura Land Trust
(805) 643 8044 dan@venturalandtrust.org

February 10, 2025

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Re: Support the Catalina Island Restoration Project

Dear Director Bonham,

On behalf of Orange County Coastkeeper, I am writing to express our organization's support for a healthy, climate resilient, and fire-resistant Catalina Island where humans and nature can thrive for years to come. Invasive species have had adverse impacts on the island for decades, and it is imperative to act now to halt and reverse the damage. Catalina Island is a special place for the many species who live on and visit the Island, with more than 60 endemic plant and animal species, 3,500 year-round residents, and a terrain that offers ample recreational opportunities for over one million annual visitors. The Catalina Island Restoration Project is critical to protect the biodiversity that will secure climate resilience for an important resource for communities across California to learn about and experience unique landscapes and species.

Catalina Island is important to Orange County Coastkeeper because of the public's accessibility to the Channel Islands and experiencing unique endemic species that live on the island. Additionally, climate resiliency is a priority for us across Southern California, and Catalina's conservation efforts align with our commitment to long-term environmental health.

Orange County Coastkeeper supports the Catalina Island Restoration Project because Catalina Island serves as a gateway to science, education, and nature for Catalina Island residents and visitors. We urge the California Department of Fish and Wildlife to support the Restoration Project. As the only accessible island in Southern California, Catalina is an important entry point for millions of people in Southern California to connect with one of the richest island ecosystems in the world through hiking, camping, snorkeling, and much more. These visitors include thousands of youth per year who participate in overnight camps centered on outdoor science and adventures, creating a foundation for the next generation of environmental leaders and stewards. Catalina Island's unique wildlife and recreation opportunities generate millions in visitor-driven revenue, supporting the people living and working on the island, many of whom have called the Island home for generations.

Catalina Island's ecosystems as we know them are at risk. Without protective measures, many native and endemic species face extinction, and the Island may no longer be able to withstand climate change or support diverse ecosystems for years to come. The effects of disappearing species are already evident, as native chaparral habitats disappear and transition into invasive annual grasslands. Native plants on the Island absorb and retain water and are drought-resistant, acting as natural protection against wildfire and providing important habitat for native animal species. When these native plants are threatened by non-native wildlife and other risks, the Island is vulnerable to devastating climate threats such as wildfire and drought. A catastrophic wildfire is inevitable, such as the 2007 Island Fire, in which 10% of the Island burned and 700 residents and visitors were forced to evacuate. Droughts are similarly unavoidable and disastrous, such as the 2011-2017 drought on the Island, which caused wildlife to die of dehydration and starvation in large numbers and residents to rely on highly polluting desalination plants. Support for the Catalina Island Restoration Project will safeguard the Island from similar catastrophic impacts, lessening the damage to the Island and bolstering the Island's ability to recover.

The Catalina Island Conservancy is an exemplary steward of Island resources, successfully balancing conservation, education, and recreation. Their Catalina Island Restoration Project is a science-based, comprehensive plan to protect the Island's biodiversity, reduce erosion, prevent wildfires, and create a sustainable environment where nature and humans will thrive for years to come. The implementation of the Restoration Project is urgent due to the heightened climate threats to the plant and animal species, residents, and ecosystems of the Island. Without the Restoration Project, communities across Southern California could lose access to one of the largest and most unique outdoor classrooms, thousands of residents could lose their homes, and the world could lose species found nowhere else on earth.

We thank you for your time and greatly look forward to working together to ensure that Catalina Island will be preserved for generations to come.

Best,

Kaysha Kenney
Marine Restoration Director
Orange County Coastkeeper
kaysha@coastkeeper.org

Newport Landing Sportfishing & Whale Watching
309 Palm St
Suit A
Newport Beach, CA 92661

Dear Senator Adam Schiff,

As a business owner on Catalina Island, I am writing to express my support for Operation Protect Catalina Island and the Catalina Island Conservancy's Island restoration work. This effort is about more than land management; it is about safeguarding our community's future by making Catalina more resilient to climate change and catastrophic wildfire. Invasive species have harmed Catalina for decades, and it is imperative to act now to halt and reverse the damage. Catalina is home to more than 60 plant and animal species found nowhere else on Earth, nearly 4,000 year-round residents, and more than one million annual visitors contributing to its tourism economy. On a personal level, Catalina is also where I enjoy recreational diving multiple times a year. Preserving the Island for future generations is deeply important to me. I support this restoration work because Catalina serves as a gateway to science, education and nature-based experiences for both residents and visitors. As the only large, publicly accessible island in Southern California, Catalina offers millions of people the chance to connect with one of the richest island ecosystems in the world through hiking, camping, snorkeling and other outdoor activities. Every year, thousands of young people attend overnight camps here, building a foundation for the next generation of environmental leaders. Catalina's unique wildlife and recreation opportunities also generate millions in visitor-driven revenue, supporting local businesses and families who have called this Island home for generations. Without protective action, Catalina's ecosystems are at serious risk. Many native and endemic species face extinctions.

as invasive plants and animals spread, leaving the Island less able to withstand climate change. The loss of native chaparral, now giving way to invasive annual grasslands, is already visible. Native plants provide essential habitat, help the soil hold water, withstand drought, and serve as natural protection against wildfire. When they are threatened, whether by non-native wildlife such as mule deer or by worsening

Newport Landing Sportfishing & Whale Watching
309 Palm St
Suit A
Newport Beach, CA 92661

climate pressures, the Island becomes increasingly vulnerable to wildfire and drought. The Palisades and Eaton fires in January 2025 remind us that fire season is every season. For an island community, evacuation is complex, and options are limited. A fire like the 2007 Island Fire, which burned 10% of Catalina and forced 700 residents and visitors to evacuate, would again endanger lives, homes, businesses and our tourism economy. From 2011–2017, drought also devastated Catalina, causing wildlife to die of thirst and forcing residents to depend on desalination plants. These plants are energy-intensive and release pollutants that harm aquatic life and raise ocean salinity. Operation Protect Catalina Island is a forward-looking investment that will help prevent these crises and strengthen Catalina's ability to recover from natural disasters. This science-based, comprehensive plan will restore native plants, reduce erosion, lower wildfire risk and protect biodiversity. With climate threats increasing, the time to act is now. Thank you for your leadership and for all you are doing to protect the people, wildlife and natural beauty of Catalina. With your support, we can ensure a healthy, resilient Island for everyone.

Best regards,

Jessica Rodriguez

Communications Manager

Newport Landing Whale Watching

April 21, 2025

Director Charlton "Chuck" Bonham
California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Via Email: Director@wildlife.ca.gov; Chuck.Bonham@wildlife.ca.gov

RE: Support for the Catalina Island Restoration Project and Fire Resilience Efforts

Dear Director Bonham,

I am writing to request your support for the Catalina Island Restoration Project - an essential conservation initiative designed to protect the long-term health and resilience of Catalina Island by creating an environment in which highly flammable invasive grasses are replaced with more fire resilient native plants. My family is one of many that have enjoyed Catalina Island for decades and value it uniqueness. Your support is vital to protect this island for future generations.

For generations, Catalina has been an ecological and recreational treasure, home to diverse wildlife, rare plant species, and a community that depends on a thriving natural environment. However, the increasing frequency of extreme wildfires has made clear the urgent need for proactive restoration and fire mitigation efforts. The Catalina Island Restoration Project is designed to address these challenges by restoring native habitats, reducing highly flammable invasive vegetation, and strengthening the island's natural defenses against wildfire and other environmental threats.

This project, which is privately funded through generous donations, is not only about protecting Catalina's landscapes—it is about safeguarding the people who live, work, and visit here, ensuring a resilient future for the island's ecosystem and economy. During the recent fires that ravaged Los Angeles County, Catalina was under the same Red Flag warning. Fortunately, the island did not experience the same fate as the mainland. But it did come close when the 2007 Island Fire almost claimed the City of Avalon - a situation we must work to ensure never happens again.

I do hope you recognize the significance of this project and the urgency moving forward. Lending your voice of support will help ensure the goals of the project are fulfilled and the island remains healthy and resilient for future generations to come.

Thank you for your time, your consideration, and for your dedication to protecting one of California's greatest natural resources.

Sincerely,

Maureen H Ramer

Maureen H. Ramer
Vice-Chair Catalina Island Conservancy Board of Directors

cc: Whitney Latorre, President and CEO, Catalina Island Conservancy
Kirsten Peterson Johansen, Chief of External Affairs, Catalina Island Conservancy

Blanny Avalon Hagenah
One Crescent Avenue
Avalon, CA 90704

April 16, 2025

Director Charlton "Chuck" Bonham
California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Via Email: Director@wildlife.ca.gov; Chuck.Bonham@wildlife.ca.gov

RE: Support for the Catalina Island Restoration Project and Fire Resilience Efforts

Dear Director Bonham,

I am writing to request your support for the Catalina Island Restoration Project. This is an essential conservation initiative designed to protect the long-term health and resilience of Catalina Island by creating an environment in which highly flammable invasive grasses are replaced with more fire resilient native plants.

As a part-time resident of Catalina I have experienced first-hand what a special place Catalina is. For generations, Catalina has been an ecological and recreational treasure, home to diverse wildlife, rare plant species, and a community that depends on a thriving natural environment. However, the increasing frequency of extreme wildfires has made clear the urgent need for proactive restoration and fire mitigation efforts. The Catalina Island Restoration Project is designed to address these challenges by restoring native habitats, reducing highly flammable invasive vegetation, and strengthening the island's natural defenses against wildfire and other environmental threats.

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Sincerely,

Blanny Avalon Hagenah

cc: Whitney Latorre, President and CEO, Catalina Island Conservancy
Kirsten Peterson Johansen, Chief of External Affairs, Catalina Island Conservancy

Catalina Adventure Tours
6400 East Marina Driver, Suite #2
Long Beach, CA 90803
September 23, 2025

Dear Senator Shiff,

As someone who lives and works on Catalina Island, I wanted to share my support for the Catalina Island Conservancy's *Island Restoration Project*. I believe this effort is an important step toward protecting our island, our community, and our way of life.

The fires we saw earlier this year were a real wake-up call that fire season isn't just a few months anymore, it's all year long. On an island, evacuations are complicated and can quickly become dangerous. Another fire like the one we had in 2007 could put lives at risk, damage homes, and wildlife, and cause lasting harm to our local economy and tourism.

While there's been some conversation about the management of mule deer, this project really goes beyond that. It's about making sure Catalina stays safe, healthy, and resilient for residents, businesses, and future generations.

The Conservancy's plan is a proactive, science-based approach that gives us a chance to get ahead of the problem instead of reacting to disaster later. I hope you'll support this project and help protect the future of Catalina Island.

Thank you for your leadership and for always keeping the well-being of our community in mind.

Thank you,

Heather Milburn
President of Operations

Channel Islands Restoration

restoring habitat and promoting environmental education

January 27, 2025

Charlton Bonham
Director, California Department of Fish and Wildlife
715 P Street
Sacramento, CA 95814

Re: Channel Islands Restoration Support the Scientific Collection Permit for the Catalina Island Restoration Project

Dear Director Bonham,

I am Executive Director of Channel Islands Restoration, and on behalf of our nonprofit organization, I am writing to express our support of the Santa Catalina Island Restoration Plan, including the Scientific Collection Permit application for the eradication of the invasive mule deer. I have first-hand experience working on Santa Rosa Island, where invasive mule deer disrupted efforts to restore endangered species populations. Mule deer on Santa Rosa Island denuded the island of vegetation, which created severe erosion problems and directly threatened endangered plants, many found nowhere else in the world, and endangered animals that depended on those plants for survival. Like on Santa Rosa, mule deer on Catalina disrupt the island's ecosystem balance and sustainability, increasing the risk of wildfires that threaten Island residents, biodiversity, and infrastructure, plus rare and endemic plants and animals that live there. With over 60,000 plant and animal species that are found nowhere else in the world, 4,000 year-round residents, and a terrain that offers ample recreational opportunities for over a million annual visitors, Catalina Island is a special place where nature and people thrive interdependently. The Catalina Island Restoration Plan is critical to protecting the biodiversity that will secure present and future climate resilience for an important community resource for Southern California and beyond.

Channel Islands Restoration supports the Scientific Collection Permit application for the eradication of the invasive mule deer as part of the Catalina Island Restoration Plan because Catalina Island is a gateway to science, education, and nature for Catalina Island residents and visitors. We urge the California Department of Fish and Wildlife to support the Permit as well. As the only large, publicly accessible island in Southern California, Catalina is an important entry point for millions of people in

Channel Islands Restoration

restoring habitat and promoting environmental education

Southern California to connect with one of the richest island ecosystems in the world through hiking, camping, snorkeling, and much more. These visitors include thousands of young people per year who participate in overnight camps centered on outdoor science and adventures, creating a foundation for the next generation of environmental leaders and stewards. Catalina Island's endemic wildlife and recreation opportunities generate millions in visitor-driven revenue, supporting the people living and working on the island, many of whom have been there for generations. I have worked on all eight of the California Channel Islands, and when I was five years old, Catalina Island wad the first island I visited. As an adult I participated in invasive plant surveys and weed removal there and toured large portions of the island. It is truly a wonderful place that should be protected from introduced animal populations and instead be cherished living biological museum.

Catalina Island's ecosystems as we know them are at risk. Without protective measures, many native and endemic species face extinction, and the Island may no longer be able to withstand climate change or support life for years to come. The effects of disappearing species are already evident. Native flora on the island absorb and retain water and are drought-resistant, acting as natural protection against wildfire and providing important habitat for native animal species. When these native plants are threatened by non-native wildlife, namely the mule deer, the Island is vulnerable to succumbing to devastating climate threats such as wildfire and drought. This is evidenced, for example, by the devastating 2007 Island Fire, in which 10% of the Island burned and 700 residents and visitors were forced to evacuate. Another example is the 2011-2017 drought on the Island, which caused wildlife to die of dehydration and starvation in large numbers and residents to rely on highly polluting desalination plants. Support for the Catalina Island Restoration Plan will safeguard the Island from similar catastrophic impacts, lessening the damage to the Island and bolstering the Island's ability to recover. The Restoration Plan must be urgently implemented.

Invasive species are one of the greatest threats to biodiversity worldwide. Removal of invasive species is imperative to preserving biodiversity and to reaching the state's goal of conserving 30% of lands and coastal waters by 2030. Eradicating the mule deer is a vital component of the Restoration Plan, and it will enable the ecosystem to recover from overgrazing and trampling. Studies have shown that aerial hunting, as proposed in the Scientific Collection Permit, is the most humane and effective method of deer removal, minimizing stress levels of deer significantly more than translocation and birth control. Despite Catalina Island having the longest recreational hunting season in the state, the mule deer population continues to grow unchecked, indicating that recreational hunting alone is not a viable method of controlling mule deer population. This was also the case on Santa Rosa Island, where the National Park Service eventually removed the deer population through a hunting program.

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Channel Islands Restoration

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I have first-hand and long-term experience of management on the Channel Islands, and I know that the Catalina Island Conservancy is an exemplary steward of Island resources, successfully balancing conservation, education, and recreation. Their restoration plan is a science-based, comprehensive plan to protect the Island's biodiversity, reduce erosion, prevent wildfires, and create a sustainable environment where wildlife and humans will thrive for years to come.

We thank you for your time and greatly look forward to working together to ensure that Catalina Island will be preserved for generations to come.

Sincerely,

Ken A. Owen

Ken Owen
Executive Director
Channel Islands Restoration

PO Box 40228 Santa Barbara, CA 93140 • (805) 448-5726 • www.cirweb.org

Exhibit E: White Buffalo Inc. Portfolio

White Buffalo Inc.
Conserving Native Species and Ecosystems

White Buffalo Inc., founded in 1995, is a 501(c)(3) nonprofit wildlife management and research organization dedicated to conserving native species and ecosystems through damage and population control. We also sponsor, support, and conduct scientific research and educational efforts to improve the understanding of natural resources for the purpose of conservation. Our approach is unique, in that we generate funding for conservation research by providing management alternatives in non-traditional settings.

Contact Information

Phone: (860) 385-4725
Email: info@whitebuffaloinc.org
Web: www.whitebuffaloinc.org

Population Reduction Programs

To date, White Buffalo Inc. personnel have lethally removed over 10,000 deer. As a result of these programs more than 200,000 pounds of venison have been donated to various food shelters.

Brookhaven National Laboratory, Upton, NY:
February 2015 - 300 deer harvested over 3.5 days
March 2017 - 202 deer harvested over 6 days
April 2019 - 250 deer harvested over 7 days

Burnsville, Minnesota (38 square miles):
November 2001 - 21 deer harvested in 2 days
November 2002 - 67 deer harvested in 7 days
January 2003 - 24 deer harvested in 7 days
March 2004 - 36 deer harvested in 4 days

Catoctin Mountain Park, Thurmont, Maryland (8 square miles):
February 2021 - 67 deer harvested in 5 days
February 2022 - 57 deer harvested in 7 days
February 2023 - 86 deer harvested in 10 days
February 2024 - 83 deer harvested in 9 days
February 2025 - 79 deer harvested in 9 days

Crystal Airport, Minnesota:
October 2000 - 11 deer were removed regional airport, over 2 days, to eliminate the chance of deer strikes on the runway.

Des Peres, Missouri:

January 2023 - 55 deer harvested over 11 days
January/February 2024 - 37 deer harvested over 5 days
January/February 2025 - 27 deer harvested over 7 days

Dune Acres, Indiana (1 square mile):

February 1998 - 50 deer harvested over 5 days

Eden Prairie, Minnesota (36 square miles):

November 1997 - 160 deer harvested over 15 days
November 1998 - 124 deer harvested over 11 days
November 1999 - 125 deer harvested over 8 days
November 2001 - 125 deer harvested over 7 days
November 2002 - 154 deer harvested over 14 days
March 2004 - 135 deer harvested over 11 days
November 2004 - 115 deer harvested over 8 days
November/December 2005 - 115 deer harvested over 14 days
November 2007 - 106 deer harvested over 11 days
November 2010 - 115 deer harvested over 14 days
November 2012 - 110 deer harvested over 14 days
November 2014 - 120 deer harvested over 12 days

Edina, Minnesota:

December 1999 - 40 deer harvested in 1 day
November 2001 - 30 deer harvested over 3 days
November 2002 - 26 deer harvested over 4 days

Elk Mills, Maryland (FMC Stine Research Center):

March 2023 - 50 deer harvested in 2 days

Fairfax County, Virginia: (Pilot program - 2 County-owned Parks)

January - February 2014 - 98 deer harvested, reduced densities below 20/mile^2
February 2015 - 40 deer harvested, reduced densities below 20/mile^2

Fire Island National Seashore, New York:

February 2020 - 230 deer harvested in 8 days
February 2021 - 98 deer harvested in 6 days
February 2022 - 113 deer harvested in 7 days
February 2023 - 112 deer harvested in 5 days
February 2024 - 98 deer harvested in 6 days
February 2025 - 75 deer harvested in 5 days

George Reserve (University of Michigan), Pinckney, Michigan (2 square miles enclosed):
March 2001 - 103 deer harvested over 3 days for tuberculosis testing.

Greenwich, Connecticut: (Pilot program - 3 town-owned parcels)
March 2005 - 80 deer harvested over 4 days

Iowa City, Iowa (6 square mile area):
January 2000 - 360 deer harvested over 10 days
December/January 2001 - 340 deer harvested over 21 days
December 2001 - 250 deer harvested over 18 days
November 2003 - 200 deer harvested over 14 days
February 2005 - 154 deer harvested over 9 days
January/February 2006 - 150 deer harvested over 11 days
January 2007 - 199 deer harvested over 14 days
January 2008 - 89 deer harvested over 8 days
February 2009 - 69 deer harvested over 15 days (2 Biologists only)
February 2010 - 57 deer harvested over 11 days (2 Biologists only)
December 2019 - February/March 2020 – 500 deer harvested over 38 days

Long Island, New Hampshire (2 square mile peninsula):
November 1996 - 90 deer harvested over 3 days

Lower Makefield, Pennsylvania (Pilot program - 6 town-owned parcels)
February/March 2010 - 94 deer harvested over 9 days

Monhegan Island, Maine (1 square mile):
April 1997 - 52 deer harvested over 3 days
April 1998 & March 1999 - remaining 27 deer harvested*
* Successful eradication of all deer on the island

Mount Lebanon, Pennsylvania (6 square mile):
February/March 2016 - 115 deer harvested over 13 days
February 2017 - 55 deer harvested over 7 days
February 2018 - 57 deer harvested over 9 days
February 2019 - 44 deer harvested over 11 days
February 2020 - 35 deer harvested over 12 days

National Park Service, Northeast Region: We won this grant through a competitive process with the National Park Service to help address the ecological impacts of overabundant white-tailed deer in northeastern parks. Our duties include collaborating on deer management plans, supporting deer population monitoring, designing multi-acre exclosures to protect sensitive habitats, and implementing deer population reduction where needed. Throughout the project, we will coordinate closely with NPS staff, adaptively manage our activities, and provide annual progress and financial reports to ensure the project's conservation objectives are achieved over the full five-year period (2005–2009).

Northern Indiana Public Service Company, Wheatfield, Indiana:

March 1996 - 100 deer harvested over 4 days from a 2500-acre enclosed facility*

* Population estimated at 130 deer prior to reduction.

Peaks Island, Maine (1 square mile):

February/March 2000 - 223 deer harvested over 8 days*

* Population was estimated at 240 before reduction.

Princeton Township, New Jersey:

February/March 2001 - 322 deer harvested over 15 days
January/February 2002 - 303 deer harvested over 27 days
February/March 2003 - 280 deer harvested over 21 days
January/February 2004 - 276 deer harvested over 27 days
January 2005 - 124 deer harvested over 13 days
February 2006 - 150 deer harvested over 15 days
February 2007 - 126 deer harvested over 14 days
February 2008 - 107 deer harvested over 15 days
January/February 2009 - 154 deer harvested over 19 days (2 Biologists only)
February/March 2010 - 148 deer harvested over 16 days (2 Biologists only)
February/March 2012 - 116 deer harvested over 16 days (2 Biologists only)
February/March 2013 - 159 deer harvested over 17 days (2 Biologists only)
February/March 2014 - 127 deer harvested over 18 days (2 Biologists only)
February/March 2015 - 250 deer harvested over 28 days (2 Biologists only)
February/March 2016 - 119 deer harvested over 21 days (2 Biologists only)
February/March 2017 - 63 deer harvested over 11 days (2 Biologists only)
February/March 2018 - 196 deer harvested over 21 days (3 Biologists)
February/March 2019 - 263 deer harvested over 26 days (3 Biologists)
February/March 2020 - 143 deer harvested over 20 days (3 Biologists)
February/March 2021 - 142 deer harvested over 20 days (3 Biologists)
February/March 2022 - 147 deer harvested over 15 days (3 biologists)
February/March 2023 - 125 deer harvested over 17 days (3 biologists)
February 2024 - 123 deer harvested in 17 days (3 biologists)
February 2025 - 124 deer harvested in 17 days (3 biologists)

Ramsey County, Minnesota (Maplewood, St. Paul):

November/December 2005 - 200 deer harvested over 12 days

Rancho Santa Fe, California (SDRE Investments LLC):

Lethal removal of coyotes, including site assessment, planning, and execution of removal operations using firearms. 2025 (pending)

Roanoke, Virginia:

January 2005 - 109 deer harvested over 7 days

Solon, Ohio:

March 2005 - 602 deer harvested over 37 days.
January/March 2006 - 400 deer harvested over 40 days
January/February 2007 - 150 deer harvested over 15 days
March 2008 - 175 deer harvested over 22 days
January/March 2009 - 250 deer harvested over 33 days (2 Biologists only)

Swarthmore College, Swarthmore, Pennsylvania:

December 2009/January 2010 - 31 deer harvested over 4 days
December 2010/January 2011 - 21 deer harvested over 4 days
December 2011/January 2012 - 9 deer harvested over 4 days
January-March 2013 - 21 deer harvested over 8 days
January-March 2014 - 19 deer harvested over 8 days
January-March 2015 - 28 deer harvested over 10 days
January-March 2016 - 19 deer harvested over 11 days
January-March 2017 - 21 deer harvested over 8 days
March 2018 - 15 deer harvested over 7 days
January-March 2019 - 20 deer harvested over 8 days
January-March 2020 - 21 deer harvested over 9 days
January-March 2021 - 31 deer harvested over 7 days
January-February 2022 - 19 deer harvested over 7 days
January-February 2023 - 20 deer harvested over 6 days
January-February 2024 - 22 deer harvested over 6 days
February-March 2025 - 23 deer harvested over 7 days

Tega Cay, South Carolina:

October-November 2024 - 200 deer sterilized via ovariectomy in 14 days

Town and Country, Missouri:

December 2009 - 112 deer harvested over 7 days
December 2010 - 75 deer harvested over 7 days
December 2011- Jan 2012 - 288 deer harvested over 28 days
December 2012 - 115 deer harvested over 11 days
January 2014 - 87 deer harvested over 8 days
January 2015 - 100 deer harvested over 9 days
January 2016 - 210 deer harvested over 21 days
January 2017 - 225 deer harvested over 19 days
January 2018 - 361 deer harvested over 35 days
January 2019 - 150 deer harvested over 18 days
January 2020 - 134 deer harvested over 19 days
January 2022 - 51 deer harvested over 7 days
January 2023 - 50 deer harvested over 7 days
January 2024 - 89 deer harvested over 11 days
January 2025 - 79 deer harvested over 11 days

Tuxedo Park, New York:
February 2012 - 98 deer harvested over 9 days

Vassar College, Poughkeepsie, New York:
January 2010 - 64 deer harvested over 2 days

Wildwood, Missouri:
January/February 2024 - 300 deer harvested over 26 days
January/February 2025 - 361 deer harvested over 31 days

Capture

We are experienced and fully equipped to provide capture services (i.e., drop-nets, rocket-nets, remote immobilization equipment). Using various techniques, White Buffalo Inc. personnel have captured over 4,000 deer as well as feral pigs, water buffalo, feral goats, and elk.

Bald Head Island, North Carolina: We captured 18 deer using darting techniques for a GonaCon research project. In addition, we trained employees of the Conservancy and local volunteers in deer capture and handling techniques (January–March 2014).

Bedford and Lewisboro, New York, USDA-ARS 4 Poster Lyme Disease Research*:
May 1998 - 8 deer captured using darting techniques over 3 days
October 1998 - 12 deer captured using darting techniques over 3 days
Oct. /November 1999 - 40 deer captured using darting techniques over 8 days
*All deer captured were checked for number and distribution of ticks.

Bluff Point/Mumford Cove, Groton, Connecticut: Urban white-tailed deer habitat use and home range study - We volunteered our service and equipment to assist in capturing white-tailed deer as part of a state-conducted research project. Deer were captured using darting equipment (Winter 1995–96).

Bridgeport, Connecticut: We captured 18 deer using a combination of drop nets and darting techniques to apply an experimental Amitraz-impregnated collar to control ticks as part of a CDC Lyme disease research project (March 1999).

Carlisle, Massachusetts: We captured 27 deer using darting techniques and applied radio transmitter collars as part of a state organized research project to assess mortality rates of suburban deer populations in eastern Massachusetts (March 1999).

Connecticut Agricultural Experiment Station, New Haven, Connecticut: Genesis Laboratories is leading a two-year field trial in partnership with the Connecticut Agricultural Experiment Station to evaluate an oral fipronil-laced bait for controlling blacklegged and lone star ticks on white-tailed deer. The study will be conducted at large, wooded sites in and around Bridgeport and Norwalk, Connecticut, including Lake Success Business Park and Manresa Island.

Connecticut Agricultural Experiment Station, New Haven, Connecticut: The CDC-funded study aims to optimize and standardize the suppression of host-seeking Ixodes scapularis (blacklegged tick) and interrupt pathogen transmission by administering systemic acaricides orally to white-tailed deer and Peromyscus species across high-risk sites in the Northeast. The research is scheduled over five years, with Year 1 (baseline) beginning in 2023 and intervention years spanning 2024–2026, potentially extending into 2027 for final analyses and publication.

Connecticut Agricultural Experiment Station, New Haven, Connecticut: We captured 38 deer using darting techniques for researchers to assess the effectiveness of oral delivery of the systemic acaricide Moxidectin to white-tailed deer in the management of the pathogen vectors *Amblyomma americanum* and *Ixodes scapularis*. Part of a Connecticut Agricultural Experiment Station research project (Summer and Fall 2021–2022).

Connecticut College Arboretum: We removed deer completely to prevent damage to native plant collections and research plots. We inspected and repaired the perimeter fence to ensure it was deer-proof. We then captured the 3 remaining deer enclosed in the 100-acre arboretum using darting techniques. Deer were released outside the fence on Connecticut College property (January 1996).

Fort Indiantown Gap, Pennsylvania: We captured, tagged, and radio-collared 61 deer for a research project for the National Guard Training Center (March 2019, February 2021).

George Reserve, Pinckney, Michigan: We captured 25 deer over 3 days using darting techniques for a doctoral research project (University of Michigan). In addition, we trained a doctoral student and technician in deer capture and handling techniques (November 1997).

Lake Gaillard Reservoir, Connecticut, Connecticut Agricultural Experiment Station:
We captured, tagged, and radio-collared 35 deer for a research project (November 2000).

Michigan DNR, Midland, Michigan: Captured feral pigs to deploy GPS collars to assess their movements and habitat usage (August 2015).

Old Lyme, Connecticut, USDA-ARS 4 Poster Lyme Disease Research:
We captured 11 deer using darting techniques to apply radio-transmitter collars and to assess the number and distribution of ticks (April 1999).

Point Reyes National Seashore, California: Captured elk to deploy GPS collars to assess elk movements relative to conflicts with ranches (October 2012).

Staten Island, New York: Captured over 2,500 white-tailed deer as part of an intensive sterilization program for New York City Parks and Recreation (2016–2023). Captured an additional 60 deer to deploy GPS collars in 2021/2022 and 2022/2023 to determine the behavioral impact of the sterilization program.

Staten Island, New York (Columbia University): Captured 45 white-tailed deer to deploy GPS collars (March 2023). Captured 30 and 16 deer for a SARS CoV2 study in January and March 2024, respectively. Captured 47 deer for a SARS CoV2 study (August 2025).

Towson, Maryland, USDA-ARS 4 Poster Lyme Disease Research:
We captured 11 deer using darting techniques over 3 days to assess the number and distribution of ticks (November 1998).

Research

We are committed to further understanding causes and solutions to wildlife/human conflicts. We assess alternative management techniques for a variety of species.

Fertility Control Research

"South Euclid, Ohio White-Tailed Deer Combined Surgical Sterilization and Sharpshooting Program", South Euclid, Ohio: This study is designed to compare the combination of sharpshooting and surgical sterilization to sharpshooting only zones within South Euclid, Ohio.

December 2021 - Captured and sterilized 61 deer over 9 days
January 2023 - Captured and sterilized 43 female deer over 6 days
January 2024 - Captured and sterilized 24 female deer over 5 days
January 2025 - Captured and sterilized 40 female deer over 5 days

"Demographic and behavioral impacts of an intensive male sterilization program for free-ranging white-tailed deer", Staten Island, New York: We captured >2,400 male deer (≥98% of the male population) using darting techniques and performed vasectomies on these animals (September 2016–February 2025).

"Examining the effectiveness of surgical sterilization and sharpshooting as a combined approach for managing suburban white-tailed deer populations", Ann Arbor, Michigan: We captured 54 females over 7 days using darting techniques and performed ovariectomies. We also culled 96 deer over 7 days in select open spaces (January/February 2017 - Year 1 of a five-year project). We captured 18 females over 5 days using darting techniques and performed ovariectomies. We also culled 115 deer over 13 days in select open spaces (January 2018 – Year 2). We captured 6 females over 3 days using darting techniques and performed ovariectomies. We also culled 112 deer over 16 days in select open spaces (January 2019). In the final year we culled 109 deer over 17 days in select open spaces (January 2020).

"Field sterilization of white-tailed deer", Mt Storm Park, Cincinnati, Ohio: We captured 41 females over 6 days using darting techniques and performed ovariectomies (December 2015). We captured 10 females over 3 days using darting techniques and performed ovariectomies (January 2017). We captured 11 females over 6 days using darting techniques and performed ovariectomies (January 2018). We captured 4 females over 3 days using darting techniques and performed ovariectomies (August

2018). We captured 7 females over 4 days using darting techniques and performed ovariectomies (January 2019). In the final year we captured 9 females over 7 days using darting techniques and performed ovariectomies resulting in >98% of the females sterilized (November 2019 – February 2020).

"Field sterilization of white-tailed deer", Village of East Hampton, New York: We captured 114 females over 12 days using darting techniques and performed ovariectomies (January 2015). We captured 46 females over 8 days using darting techniques and performed ovariectomies. We also performed 50 vasectomies on males (November 2015).

"Field sterilization of white-tailed deer", National Institutes of Health, Bethesda, Maryland: We captured 24 females over 3 days using darting techniques and performed ovariectomies (December 2014). We captured 5 females in 1 day using darting techniques and performed ovariectomies (December 2015). We captured 8 females in 1 day using darting techniques and performed ovariectomies (December 2016). We captured 2 females in 1 day using darting techniques and performed ovariectomies (December 2017). We captured 3 females in 1 day using darting techniques and performed ovariectomies (February 2019).

"Field sterilization of white-tailed deer", Fairfax City, Virginia: We captured 18 females over 6 days (January/February 2014), 18 females over 5 days (January 2015), 6 females over 3 days (December 2015), 5 females over 3 days using darting techniques and performed ovariectomies/tubal ligations (December 2016), and 5 females over 3 days using darting techniques and performed ovariectomies/tubal ligations (January 2018).

"Field sterilization of black-tailed deer", The Villages Golf and Country Club, San Jose, California: We captured all females (99) over 9 days using darting techniques and performed ovariectomies/tubal ligations (January/February 2013). We captured 9 females using darting techniques and performed ovariectomies (October 2013). Population estimates were derived using local demographics and the known number of females in conjunction with Distance sampling surveys. Detailed data on immigration and survival rates also were collected (November 2014).

"Field sterilization of white-tailed deer", Cayuga Heights, New York: We captured 137 females (>97% of females present) over 14 days using a combination of drop nets and darting techniques and performed ovariectomies (December 2012). We captured all remaining females (n = 12) using darting techniques and performed ovariectomies (December 2013). We captured 6 females over 2 days using darting techniques and performed ovariectomies (March 2016). Population estimates were derived using local demographics and the known number of females in conjunction with camera surveys at baited locations. Detailed data on immigration and survival rates also were collected.

"Field sterilization of white-tailed deer", Wildlife Rescue, Phoenix, Maryland: We captured 32 dogs over 8 days using darting techniques and performed ovariectomies (February 2011). We captured 14 does over 5 days using darting techniques and performed ovariectomies (February 2012). We captured 9 does over 3 days using darting techniques and performed ovariectomies (February 2013 and 2014). We captured 11 does over 4 days using darting techniques and performed ovariectomies (February 2015). We captured 14 does over 6 days using darting techniques and performed ovariectomies (February

2022). We captured 15 does over 6 days using darting techniques and performed ovariectomies (February 2023). Population estimates were derived using local demographics and the known number of females in conjunction with direct observations at baited locations. Data on immigration and survival rates also were collected.

"Evaluation of hand-injection versus dart administered GonaCon in female white-tailed deer", Bridgeport, Connecticut: A research project to determine the relative efficacy of the GonaCon vaccine when administered via two different approaches (Jan 2013–Feb 2014).

"Field sterilization of white-tailed deer", Town and Country, Missouri: We captured 100 does using a combination of drop nets and darting techniques and performed ovariectomies (December 2009). We captured 30 doings over 6 days using darting techniques and performed ovariectomies (December 2010). Population estimates were derived using Distance sampling methods.

"Feasibility and efficiency of field sterilizations via tubal ligation/ovariectomy in female white-tailed deer", Bridgeport, Connecticut: A research project to determine the relative efficiency of sterilization procedures compared to Immunocontraceptive vaccines (2008–2011).

"Efficacy evaluation of the GonaCon immunocontraceptive vaccine in fallow deer: an EPA pivotal field study", Point Reyes National Seashore, California: This study is to be conducted as a requirement of the EPA authorization process for a New Animal Drug. The primary objective is to verify the magnitude and duration of a single shot of GonaCon™ on female fallow deer. Seventy did were captured and treated (July 2007–2009).

"Efficacy evaluation of the GonaCon Immunocontraceptive vaccine in white-tailed deer: an EPA pivotal field study", Giralda Farms, Madison, New Jersey: This study is to be conducted as a requirement of the EPA authorization process for a New Animal Drug. The primary objective is to verify the magnitude and duration of a single shot of GonaCon™ on female white-tailed deer. Sixty-six dogs were captured and treated (July 2005–2009).

"Experimental density maintenance using infertility agents of a suburban population of white-tailed deer following a reduction using sharpshooting techniques", Newark, Delaware: A research project to assess the utility of combining fertility control methods with lethal management options within a 600 acre privately owned facility. Twenty-one deer were captured and 100 harvested (August 2005–2008).

"Experimental control of a suburban population of white-tailed deer using immunocontraception", Princeton Township, New Jersey: A research project to assess the practicality and feasibility of reducing, then maintaining the local deer population, within a 3-mile^2 area of town, at approximately 40/deer/mile^2 using SpayVac and GonaCon™. To date, 105 have been captured and treated. The first year's funding was provided by White Buffalo Inc. (March 2003–2008).

"Evaluation of alternative PZP immunocontraceptive formulations in female white-tailed deer", Bridgeport, Connecticut: A research project to determine the relative efficacy and longevity of various formulations of the PZP vaccine (June 2000–2007).

"Cost-effectiveness of maintaining an enclosed deer population using antifertility agents after an initial population reduction using sharpshooting techniques", Duke Farms, Hillsborough, New Jersey: A research project to assess the utility of combining fertility control methods with lethal management options within a 2700 acre privately owned facility. Forty deer were captured and 221 harvested (November 2004–2006).

"Experimental control of an urban population of white-tailed deer using contraception", Cleveland, Ohio: A research project to assess the feasibility and practicality of using a contraceptive agent to reduce herd size in the Ohio and Erie Canal Reservation. Over 300 deer were captured. Funding provided by the Cleveland Metroparks (March 2001–2005).

"Experimental control of an enclosed suburban population of white-tailed deer using contraception", Bridgeport Connecticut: Designed and implemented a research protocol to assess the feasibility and practicality of using a contraceptive agent to maintain herd size (June 1999–June 2000).

Lyme Disease Research

"An Integrated and Individual Tick Management Program to Reduce Risk of Lyme Disease in a Residential Endemic Area", Redding, Connecticut: A collaborative effort between White Buffalo Inc. and the Connecticut Agricultural Experiment Station to evaluate whether localized deer population reductions can reduce *Ixodes* tick abundance and subsequent risk of Lyme disease. Funding provided by the Center for Disease Control (September 2012–August 2015).

"Control of the tick, Ixodes scapularis Say, on white-tailed deer at a suburban Lyme disease focus", Old Lyme, Connecticut: A collaborative effort between White Buffalo Inc., the Connecticut Agricultural Experiment Station, Yale University, and the United States Department of Agriculture-Agricultural Research Service to evaluate a four-poster feeder system to control deer ticks on free-ranging white-tailed deer in a suburban community. Funding provided by the United States Department of Agriculture (USDA) (August 1997–July 2002).

"Control of the tick, *Ixodes scapularis* Say, on white-tailed deer at an urban Lyme disease focus", Bridgeport, Connecticut: A collaborative effort between White Buffalo Inc. and the Connecticut Agricultural Experiment Station to evaluate an experimental Amitraz-impregnated collar to control ticks on an enclosed white-tailed deer population. Funding provided by the Center for Disease Control (March 1999–February 2000).

"Control of the tick, *Ixodes scapularis* Say, on white-tailed deer at an urban Lyme disease focus", Bridgeport, Connecticut: A collaborative effort between White Buffalo Inc. and the Connecticut Agricultural Experiment Station to evaluate a four-poster feeder system to control deer ticks on an enclosed white-tailed deer population. Funding provided by the Center for Disease Control (CDC) (May 1997–February 1999).

Other Research

"Lana'i: A comparison of sUAS (drone), camera trap, and helicopter ungulate population estimates in Hawaii". With the assistance of a grant from the National Fish and Wildlife Foundation, we partnered with Island Conservation and Hawaii Division of Forestry and Wildlife to estimate axis deer and mouflon sheep density and distribution, and developed a monitoring program in the Kuahiwi a Kai program area on Lana'i, Hawaii. The main activities to accomplish these goals included 1) estimating distribution and density of ungulates using sUAS (drone) with infrared sensors and trail-camera technology that can be extrapolated to the rest of Lana'i, 2) comparing these efforts with traditional helicopter estimates, and 3) developing a repeatable monitoring program for assessments in future years by Pūlama Lana'i resource managers.

"Model-Guided Animal Prevalence Surveillance ("Project GAPS")", The Pennsylvania State University, State College, Pennsylvania: A USDA-funded research project designed to detect Covid-19 in 58 North American species of wildlife. White Buffalo Inc. collected or made available samples from 30–50 white-tailed deer at up to 5 locations annually (2023–2025).

"Infant survival and den site selection of female raccoons following removal and exclusion from residences", Hartford County, Connecticut: A research project designed to assess the management implications of on-site release of female raccoons during the infant-rearing season (April 1998–2000).

"White-tailed deer herd health assessment", Purdue University: We coordinated and conducted deer harvest and capture operations and data collection to assess morphological and physiological parameters as indicators of individual deer condition. These data were then used to assess herd health of deer in hunted versus unhunted areas in Indiana. Research sites included Brown County State Park, Crane Naval Surface Warfare Center, Pigeon River State Fish and Wildlife Area, and Pokagon State Park (March 1996).

International Research/Management Programs

Dededo, Guam: Successfully removed 311 feral pigs from Dededo, Guam to reduce feral pig damage and immigration to Marine Corps Base Camp Blaz (MCBCB). Work completed as part of the Readiness and Environmental Protection Integration (REPI) Challenge 2023: Landscape-scale feral pig control in northern Guam grant (2023–2025).

Piti, Guam: With a grant received from the U.S. Department of the Interior, Office of Insular Affairs (OIA), our objective is to control wild pigs in Piti, Guam with the help of local landowners at the landscape scale using a novel and affordable pig trapping system that focuses on synchronized removal across a network of traps. We will collect new trapping data from field trials, including pig sign, the proportion of pigs captured, and staff/landowner hours per pig removal. We hypothesize that a high percentage of pigs will be captured, significantly reducing local pig populations. We also hypothesize reduced environmental damage from wild pigs post-trapping efforts (2022–present).

Sépaq Montreal National Parks, Quebec:
November/December 2023 - 400 deer harvested over 5 days

Sidney Island, British Columbia:
December 2023 - 84 deer harvested over 11 days

Guam: Successfully completed a pig and Philippine deer eradication on Andersen Air Force Base (AAFB), Navy Base Guam (NBG), and Marine Corps Base Camp Blaz (MCBCB). A total of 63 deer and 26 feral pigs were removed from NBG properties (November 2024). A total of 115 deer and 74 feral pigs were removed from AAFB (August–November 2024). A total of 208 deer and 51 feral pigs were removed from MCBCB (August 2024–April 2025).

Guam: Successfully completed a pig and Philippine deer eradication on Andersen Air Force Base (AAFB), Navy Base Guam (NBG), and Marine Corps Base Camp Blaz (MCBCB). A total of 206 deer and 25 feral pigs were removed from NBG properties (September–November 2023). A total of 155 deer and 75 feral pigs were removed from AAFB (July–November 2023). A total of 50 deer and 5 feral pigs were removed from MCBCB (September–November 2023).

Guam: Successfully completed a pig and Philippine deer eradication on Andersen Air Force Base (AAFB), Navy Base Guam (NBG), and Marine Corps Base Camp Blaz (MCBCB). A total of 206 deer and 25 feral pigs were removed from NBG properties (September–November 2023). A total of 155 deer and 75 feral pigs were removed from AAFB (July–November 2023). A total of 50 deer and 5 feral pigs were removed from MCBCB (September–November 2023).

Guam: Successfully completed a pig and Philippine deer eradication on AAFB and NBG. A total of 307 deer and 121 feral pigs were removed from AAFB (July–September 2022). A total of 22 deer and 18 feral pigs were removed from NBG properties (September–October 2022).

Guam: Successfully completed a pig and Philippine deer eradication on AAFB and NBG. A total of 310 deer and 165 feral pigs were removed from AAFB (September–December 2021). A total of 41 deer and 73 feral pigs were removed from NBG properties (October–November 2021).

Guam: Successfully completed a pig and Philippine deer eradication project on ~260-acres of MCBCB. Forty-five feral pigs and 321 deer were removed using dog-supported ground shooting (August 2021–October 2021).

Guam: Successfully completed a pig and Philippine deer eradication project on ~400-acres of MCBCB. 75 feral pigs and 256 deer were removed using dog-supported ground shooting (April 2020–November 2020).

Guam: Conducted feral pig eradication monitoring on NBG and ungulate control on the Naval Munitions Site. Thirty-six re-migrant feral pigs were removed from NBG using dog-supported ground shooting. A total of 300 ungulates (191 Philippine deer; 109 feral pigs) were removed from the Naval Munitions Site in 13 days using ground shooting techniques (August 2019–October 2019).

Guam: Implemented a water buffalo (Carabao) management project on NBG - Naval Magazine. Twenty-three male water buffalo were captured and vasectomized to control reproduction in the local herd (May 2018). Twelve male carabao were sterilized resulting in a reproductively defunct residual population (August 2019). Five additional yearling males were captured and sterilized in October–November 2021.

Guam: Successfully captured 9 feral pigs and 9 Philippine deer on AAFB. Animals were released with GPS collars to monitor their movement patterns on the installation (July 2019).

Guam: Performed lethal feral pig removal from NCTMS using a combination of UXO-compliant corral traps and ground shooting techniques. One hundred and forty-one pigs were removed in 13 days (March 2019).

Guam: Successfully completed a pig eradication project on NBG (November 2017 – March 2018). We also successfully eradicated pigs and Philippine deer in an 80-acre fenced exclosure on the Naval Munitions Site (April 2018).

Quebec, Canada: Implemented a white-tailed deer sampling and depopulation program for the Quebec Ministry of Forests, Wildlife, and Parks to address a CWD outbreak in a captive deer farm. We euthanized 750 white-tailed deer and sampled for CWD. We also trained Wildlife Officers to professional cull free-ranging deer (September–December 2018).

Haida Gwaii, British Columbia: Participated in an international workshop to evaluate the feasibility of non-native deer eradication from isolated islands in the archipelago (May 2015). Designed an eradication program for non-native black-tailed deer and provided Parks Canada staff training (September 2015). Implemented eradication program for non-native black-tailed deer for Parks Canada (April–May 2017).

Guam: Developed a research project to assess the impacts and optimal control/eradication methods for non-native ungulates on AAFB and NBG (Philippine deer and feral pigs) (September 2014–May 2015).

Botswana: Assisted the Denver Zoological Society in capturing vultures to study their ecology and to determine causes of their decline. Vultures were captured with remotely launched nets and GPS units were attached (June 2012).

Japan: Consulted for the Japanese Ministry to establish a program to address Sika deer overpopulation issues. Designed a management and training program for government and university biologists (July 2010).

Mongolia: Assisted the Denver Zoological Society and the Mongolian Academy of Sciences in capturing threatened Argali Sheep and Ibex. The intent of the research is to study Argali ecology and to determine feasibility of repopulating areas where numbers have declined. Argali were remotely captured with darting equipment and drive nets, and radio-collars were attached (September 2002, April 2003, September 2003, 2004, and 2006).

Bhutan: Consulted for the Bhutan Ministry of Agriculture and the Bhutan Trust Fund to assess techniques and equipment used for wild pig control. Designed a research program that incorporated lethal components to address subsistence agricultural damage in remote villages (May 2003, October 2003).

Galapagos National Park, Ecuador: Participated in an international workshop to design a program for the eradication of feral goats on Isabela Island (9–18 September 1997).

Miscellaneous Management Programs

Cayuga Heights, Ithaca, New York: Given statutes, the only remaining lethal option for deer population mitigation was to opportunistically capture deer using remote immobilization equipment from roadways, then euthanize them via lethal injection while they were under anesthesia. During the first year (2018) of capture and euthanasia efforts 45 deer were removed from the Village. In 2019, 15 deer were removed. In 2020, no deer management efforts were conducted due to the Covid-19 pandemic. In 2021, 2022, 2023, 2024, and 2025, 21, 19, 14, 11, and 16 deer were removed, respectively.

National Institute of Standards and Technology, Gaithersburg, Maryland: We collaborated with The Humane Society of the United States (HSUS) to captured 61 females over 8 days using darting techniques and performed ovariectomies (February 2016).

General Motors Campus, Milford, Michigan: We conducted a wildlife mitigation program to minimize risks associated with vehicles impacting wildlife during testing operations. These efforts included lethal removal of turkeys, coyotes, and deer using firearms (2021–2025).

Andersen Air Force Base and Navy Base, Guam: Efficiently and safely completed an intensive non-native ungulate (Philippine deer and feral pigs) control program. We removed over 600 deer and feral pigs using ground–based shooting techniques. To assess deer behavior, we capture and administered GPS collars. We also sampled 200 animals for disease surveillance research (March–May 2015).

Channel Island National Park, Santa Rosa Island, California: Successfully completed an island-wide non-native ungulate (mule deer and elk) eradication program. We removed deer and elk using ground and aerial shooting techniques. Some deer were captured from a helicopter using a net gun to serve as Judas animals (October 2011–November 2013).

Point Reyes National Seashore, California: Successfully completed a Park-wide non-native deer (Fallow and Axis deer) eradication program. We first implemented an EPA pivotal study using the GonaCon vaccine on 80 female Fallow deer. Deer were then live-trapped followed by euthanasia to reduce large group sizes. We then removed deer using ground and aerial shooting techniques. Some deer then were captured from the ground and from a helicopter using a net gun and dart rifle to serve as Judas animals. Finally, Fallow deer were captured and sterilized using ovariectomies (females) and vasectomies (on males) (June 2007–April 2009).

Desecheo Island, Puerto Rico: Participated in an island wide rhesus macaque eradication program. Feral macaques were removed using ground-shooting techniques during the day and at night (March 2009, April 2010, March 2011).

Santa Cruz Island, California: Implemented in an island wide turkey eradication program. Turkeys were removed using trapping, as well as ground and aerial shooting (Nov – Dec 2006).
Assisted in an island wide feral pig eradication program. Pigs were removed using trapping, as well as ground and aerial shooting techniques (May–July 2005).

Catalina Island, California: Participated in an island wide feral pig and goat eradication program. Feral goats were captured from the ground and from a helicopter using a net gun and dart rifle to serve as Judas goats. Pigs were live-trapped followed by euthanasia. Feral goats and pigs were removed using ground-shooting techniques (June–September 1998).

Population Assessments

White Buffalo Inc. regularly conducts estimates of population size using sUAS (drone), spotlight surveys (distance sampling), or mark/re-sight techniques.

Bedford and Lewisboro, New York: We conducted helicopter snow counts to determine deer densities in study sites as part of the USDA-ARS 4-poster Lyme disease research project (March 1999, February 2000, February 2001).

Chatham, New Jersey: Distance sampling estimates to determine deer densities
(January 2007).

Chesterfield, Missouri: We conducted Distance sampling estimates to determine deer densities (January 2018, 2020).

Des Peres, Missouri: We conducted Distance sampling estimates to determine deer densities (January 2016, 2017, 2018, 2019, 2020, and 2022).

Dune Acres, Indiana: We conducted a white-tailed deer population estimate using spotlighting techniques and consulted with the community regarding the feasibility of implementing a white-tailed deer population reduction program (December 1996).

Ellisville, Missouri: We conducted Distance sampling estimates to determine deer densities (January 2015 and 2017).

Fenton, Missouri: We conducted Distance sampling estimates to determine deer densities (January 2020).

Helena, Montana: Distance sampling estimates to determine deer densities (October 2009).

Howard County, Maryland: We estimated deer density and distribution via a sUAS (drone) survey (March 2025–2027).

Howard County, Maryland (Columbia Association HOA): We estimated deer density and distribution via a sUAS (drone) survey (March 2025).

Iowa City, Iowa: We estimated deer density and distribution via a sUAS (drone) survey (February 2025).

Kingston, Rhode Island: We conducted helicopter snow counts to determine deer densities in study sites as part of the USDA-ARS 4-poster Lyme disease research project (February 1999, January 2001).

Ladue, Missouri: We conducted Distance sampling estimates to determine deer densities (January 2016, 2017, and 2018). Estimated deer abundance data (2025).

Lana'i, Hawaii: We estimated axis deer and mouflon sheep density and distribution via sUAS (drone) and camera trap methods (July 2024).

Manchester, Missouri: Distance sampling estimates to determine deer densities (March 2014).

New Canaan, Connecticut: We conducted a white-tailed deer population estimate using helicopter snow counts to determine deer densities throughout the community (February 2001).

Old Lyme and Old Saybrook, Connecticut: We conducted helicopter snow counts to determine deer densities in study sites as part of the USDA-ARS 4-poster Lyme disease research project (February 1999).

Polson, Montana: Distance sampling estimates to determine deer densities (January 2024).

Princeton Township, New Jersey: A helicopter snow count was conducted to determine deer densities throughout the community (December 2002). We conducted distance sampling estimates to determine deer densities (February 2011, April 2014, December 2015, March 2018).

San Jose, California: We conducted distance sampling estimates to determine deer densities in a private association - The Villages Golf and Country Club (September 2010, October 2012, November 2014).

St. Albans, Missouri: Distance sampling estimates to determine deer densities (January 2024).

Sunset Hills, Missouri: Distance sampling estimates to determine deer densities (December 2012, January 2014).

Town and Country, Missouri: We provided an assessment of deer management options for potential implementation in the community. We also conducted a white-tailed deer population estimate using spotlighting techniques (February 1997, December 2009–January 2020 annually, February 2022, February 2024).

Ulster County, New York (Scenic Hudson): We estimated deer density and distribution via a sUAS (drone) survey (February 2025).

Upper Makefield, Pennsylvania: We conducted Distance sampling estimates to determine deer densities (March 2010).

Westport and Weston, Connecticut: We conducted helicopter snow counts to determine deer densities in 2 communities as part of a CDC Lyme disease research project (February 2000).

Wildwood, MO: Estimated deer abundance from data produced by city (2024–2025).

Consultations, Training and Hunt Management

Initial consultations are conducted to provide site-specific cost and feasibility assessments for all management/research options. In addition, a comprehensive report can be prepared that details all organizational aspects (social, legal, and technical) necessary for implementation of any management technique. We design sharpshooting programs, specify equipment requirements, and train participants in sharpshooting methods. We also design, organize, and oversee suburban hunting programs. Other consultations include deer browse surveys and human dimensions inquiry via focus groups and survey research to assist communities in assessing deer impacts and social carrying capacity for possible mitigation efforts.

- **Bloomington, IN** - 2019–2025
- **Montgomery, NJ** - February 2020
- **Edison, NJ** - April 2018
- **Catalina Island Conservancy** - June 2015
- **Mt Lebanon, PA** - August 2013; June 2015
- **NYSDEP; New York City watershed** - June 2015
- **North Haven, Long Island, NY** - August 2013
- **Binghamton University, NY** - January 2012
- **Village of Cayuga Heights, NY** - November 2011
- **The Villages Golf and Country Club, San Jose, California** - September 2010/October 2012/November 2014
- **Hudson, Ohio** - July 2010
- **Warrensburg, Missouri** - February 2009
- **Town and Country, Missouri** - July 2008
- **Shawnee Mission Parks, Kansa City, Kansas** - March 2008
- **Locust Hill Association, Cincinnati, OH** - January 2007
- **Chatham, New Jersey** - January 2007
- **Milburn, NJ** - August 2005

- **Bryn Gweled, Pennsylvania -** April 2005
- **Lake Metroparks, Concord Township, Ohio** - March 2004
- **Columbia Heights, Minnesota** - November 2003
- **Summit County Metroparks, Akron Ohio** - July 2003
- **Roanoke, Virginia** - March 2003
- **Bald Head Island, Wilmington, North Carolina** - December 2002
- **Ramsey County, Minnesota** - November 2002
- **Hamilton County Parks, Cincinnati, Ohio** - July 2002
- **Five Rivers Metroparks, Dayton Ohio** - July 2002
- **Biltmore Forest, North Carolina** - May 2001 and July 2002
- **Armand Bayou Nature Center, Houston, Texas** - October 2000
- **Maryland National Capital Park and Planning Commission** - July 2000
- **Barton Creek, Texas** - June 2000
- **Lakeway, Texas** - June 2000
- **Westport, Connecticut** - May 2000
- **Silver Springs, Maryland** - February 2000
- **Marinette, Wisconsin** - January 2000
- **George Reserve, Pinckney, Michigan** - November 1999
- **Goddard Space Flight Center, NASA, Greenbelt, Maryland** - November 1999
- **Iowa City, Iowa** - August 1999
- **Massachusetts Water Resource Authority, Weston, Massachusetts -** June 1999
- **Peaks Island, Maine** - June 1999
- **Detroit Metroparks, Michigan** - December 1998
- **Princeton, New Jersey** - September 1998
- **Reeves-Reed Arboretum, Summit, New Jersey** - September 1998
- **Amherst, New York** - May 1998
- **Fairmount Park, Philadelphia, Pennsylvania** - May 1998
- **Kinnelon, New Jersey** - February 1998
- **Edina, Minnesota** - December 1997
- **Gaithersburg, Maryland** - November 1997
- **Darien, Connecticut** - October 1997
- **Block Island, Rhode Island** - August 1997
- **Groton Long Point, Connecticut** - August 1996

Arlington, Virginia: Conducted deer browse surveys, focus groups, and online public surveys for Arlington County Parks and Recreation Department to inform future deer mitigation efforts (2022–2024).

Bluff Point/Mumford Cove, Groton, Connecticut: Collaborated with Connecticut DEP to design and oversee a community-based controlled archery/shotgun hunt (November/December 2000).

Burnsville, Minnesota: Designed a deer population reduction program using sharpshooting techniques. Trained law enforcement personnel in field methods including shot selection and proper shooting techniques (October 2010).

Cleveland Metroparks, Cleveland, Ohio: Designed a deer population reduction program using sharpshooting techniques for the Cleveland Metroparks. Trained Park Rangers in field methods including shot selection and proper shooting techniques (December 1998/January 1999).

Duke Farms Foundation, Hillsborough, New Jersey: Designed, organized, and managed a controlled archery/shotgun hunt successfully reducing deer densities from >150 deer /mile squared to ~20 deer/mile squared (Fall 2005–present).

Island Conservation, Santa Cruz, California: Developed and administered a professional training program for biologists involved in wildlife population control, particularly non-native species eradication (November 2009/February 2010).

Maryland National Park and Planning Commission, Maryland: Designed a deer population reduction program using sharpshooting techniques for the Park Commission. Trained Park personnel in field methods including shot selection and proper shooting techniques (October 2000/January 2001/September 2007).

Metroparks Serving Summit County, Akron, Ohio: Designed a deer population reduction program using sharpshooting techniques for the Metroparks serving Summit County. Trained park rangers in field methods including shot selection and proper shooting techniques (November 2003/February 2004).

Mt Lebanon, Pennsylvania: Organized and managed a controlled archery hunting program in a 6 mile^2 community. Volunteer archers harvested 81 deer without incident (August 2015–January 2018).

North Haven, New York: Designed, organized, and managed a deer depredation program in a ~3 mile^2 community (Winter 2014).

New York Police Department, Emergency Service Unit: Developed and administered a professional training program to safely, humanely, and discreetly immobilize and euthanize wildlife (May 2018).

Ram Island, New York: Designed, organized, and trained local hunters for a deer depredation program (Winter 2016).

Saint Elizabeth, Convent Station, New Jersey: Designed, organized, and managed a controlled archery hunt on a 180-acre private school campus (Fall 2009).

Shawnee Mission Park, Kansas: Designed a deer population reduction program using sharpshooting techniques for the Johnson County Parks. Trained Park and law enforcement personnel in field methods including shot selection and proper shooting techniques. We removed 313 deer in 3 nights using sharpshooting techniques (September/November 2009).

Teatown Lake Reservation, Ossining, New York: Designed and organized a controlled archery hunt on an 875-acre private nature preserve (Fall 2014).

Tokyo and Hokkaido, Japan: Provided workshops and seminars on wildlife damage management techniques and advised on management options for sika deer. Conducted preliminary training for wildlife professionals on sharpshooting techniques and concepts (July 2010).

Tuxedo Park, New York: Designed a deer population reduction program using sharpshooting techniques for the Village of Tuxedo Park. Trained law enforcement personnel in field methods including shot selection and proper shooting techniques. We removed 98 deer in 9 nights using sharpshooting techniques (February 2012).

Village of Cayuga Heights, New York: Organized and managed a controlled archery culling program (crossbow only) in a 1.8 mile^2 community. Forty-eight deer culled over 8 days with zero deer wounded or lost (March 2015). Twenty-four deer culled over 8 days with zero deer wounded or lost (March 2016). Thirteen deer culled over 6 days with zero deer wounded or lost (February/March 2017).

Educational Efforts

- NWCOA Sharpshooting training, Chester, CT. May 2023
- NWCOA Sharpshooting training, Chester, CT. March 2021
- Presented at the Northeast Fish and Wildlife Conference. Surgical sterilization of female white-tailed deer in suburbia. April 2019.
- Wild Horse and Burro Workshop, Albuquerque, NM. Applying wildlife management strategies to feral horse and burro fertility control programs. November 2018.
- Presented at the AVMA conference on Humane Endings. Planning for emergency killing of free-range animals. November 2018.
- Presented at the The Wildlife Society 25th Annual Conference. Surgical sterilization of female white-tailed deer in suburbia. October 2018.
- Wildlife Fertility Control Workshop, New York. Surgical sterilization of female white-tailed deer in suburbia. May 2018.
- 8th International Conference on Wildlife Fertility Control, Washington, D.C. July 2017
- Texas Parks and Wildlife Urban Deer Conference. San Marcos, TX. May 2015
- Presented at the AVMA conference on Humane Endings. Considerations when euthanizing wildlife with firearms. November 2014.
- NWCOA Sharpshooting training, Roanoke, VA. September 2014
- Presented at a deer management forum on surgical sterilization for the Village of East Hampton (NY) Preservation Society. July 2013
- Presented at the North American Deer Farmers Association Annual Conference. Chemical immobilization of captive Cervids. March 2011.

- Presented at the The Wildlife Society 17th Annual Conference. Suburban Hunter Education. October 2010.
- Presented at the 46th Annual Northeast Deer Technical Committee Meeting. Suburban Hunter Education. September 2010.
- Participated in a workshop organized by the University of Nebraska, Lincoln focused on sharpshooting training. August 2010.
- Presented at the 66th Annual Northeast Fish and Wildlife Conference. Suburban Hunter Education. April 2010.
- Participated in the Wildlife Society's summer field techniques course providing classroom lecture and field training in wildlife immobilization. June 2009 and May 2010.
- Provided a seminar on career development for high school students at Nonnewaug High School, Woodbury, Connecticut. April 2010.
- Presented for the Newtown, CT Lyme Disease Action Committee on deer management options and the potential effects on tick abundance. January 2010.
- Participated in a workshop organized by the University of Nebraska, Lincoln focused on immobilization and sharpshooting training. August 2009.
- Presented at the 65th Annual Northeast Fish and Wildlife Conference. Usage of a digital aerial sketch mapper for conducting aerial snow counts of deer. April 2009.
- Presented at the 64th Annual Northeast Fish and Wildlife Conference. GonaCon in Perspective. April 2008.
- Presented at Trinity College's Senior Biology Major Seminar. Discussions focused on contraception technologies and career options for Biology Majors. September 2007.
- Presented at the 63rd Northeast Fish and Wildlife Conference on the present status of infertility technology for deer. April 2007.
- Presented 2 seminars at Texas State University that summarized management techniques and the human dimensions of suburban deer management. October 2006.
- Spoke at 3 lectures for the "Connections Committee" of Cedar Rapids, Iowa. Discussed urban deer management, and the development and application of fertility control. October 2004.
- Presented data from the on-going fertility control research project in Princeton, N.J. to the Northeast Deer Technical Committee. September 2004.
- Guest lecturer, Rutgers University, Animal Sciences Department Seminar Series. Presented "*The Future of Fertility Control in White-tailed Deer Management*". Feb 2004.
- Presented at the 10th Annual Wildlife Society Conference held in Burlington, Vermont September 2003.
- Guest lecturer at Yale School of Forestry and Environmental Studies. Discussed the social, biological, technical, and political issues involved when managing wildlife populations. New Haven, Connecticut. April 1998, 1999, 2000, and 2001.
- Presented data from the 3-year urban raccoon study entitled *"Den site selection and movement patterns of female raccoons following removal and exclusion from residences"*, conducted in Hartford County, CT, at the Northeast Fish and Wildlife Conference held in Saratoga Springs, NY. April 2001.

- Presented data from the 3-year urban raccoon study entitled *"Den site selection and movement patterns of female raccoons following removal and exclusion from residences"*, conducted in Hartford County, CT, at the Eastern Wildlife Damage Conference held at the University of Pennsylvania. October 2000.
- Presented *"The Art and Science of Sharpshooting: one professional's perspective after five years"* at the joint Mid-west and Northeast Deer Technical Meeting held in Alpena, Michigan. August 2000.
- Participated in a Coe College Biology Seminar and Issues Discussion regarding the technical and social aspects of deer management. Cedar Rapids, Iowa. November 1999.
- Presented data from the Monhegan Island, Maine eradication program at the Northeast Deer Technical Committee Meeting in Greenville, Maine. September 1999.
- Taught the wildlife euthanasia portion of the Connecticut Nuisance Wildlife Control Operator's training course. Focused on approved euthanasia techniques for use on nuisance wildlife. Burlington, Connecticut. October 1998.
- Supervised 2 Yale University graduate students during internships with White Buffalo Inc. Activities included contraceptive delivery, home range assessment using radio-telemetry equipment, and capture techniques. In addition, 11 deer were captured, radio-collared, and movements monitored as part of the USDA-ARS 4-poster research project in Old Lyme, Connecticut. September 1998 – June 2000.
- Presented data from Long Island, New Hampshire, Eden Prairie, Minnesota, and Monhegan Island, Maine reduction programs at the 5th Annual Wildlife Society Conference held in Buffalo, New York. September 1998.
- Participated in the "Status and Future of Wildlife Fertility Control" Workshop and Panel Discussion at the 5th Annual Wildlife Society Conference held in Buffalo, New York September 1998.
- Presented at the annual National Nuisance Wildlife Control Operator's Conference. Discussed the social and political issues surrounding white-tailed deer population control. Bridgeport, New Jersey. February 1998.
- Presented data from Long Island, New Hampshire, and Monhegan Island, Maine deer reduction programs at the Midwest Fish and Wildlife Conference held in Milwaukee, Wisconsin. December 1997.
- Presented data from Long Island, New Hampshire deer reduction program at the Northeast Fish and Wildlife Conference held in Framingham, Massachusetts. April 1997.
- Presented data from Long Island, New Hampshire reduction program at the Southeast Deer Study Group Meeting held in Charleston, South Carolina. March 1997.

References – upon request

Board of Directors

Mr. Gary Aurora
26 Peck Lane, Hamden, CT 06514
Telephone: (203) 230-2768 Email: gmaurora@yahoo.com

Gary is currently employed by the New Haven Board of Education as a teacher at the Hyde Leadership School. He is certified to teach Social Studies (grades 7–12) and has done so for over 30 years and has served as Dean of Students for numerous years. In addition, Mr. Aurora has coached 4 varsity level sport teams over the last 10 years. He received a BA from Colgate in Political Science and his JD from Quinnipiac School of Law. Gary also has obtained a 6th Year Certificate in Educational Leadership from Southern Connecticut State University (SCSU) and is certified in school administration. He has conducted diversity workshops for the Anti-Defamation League and been a guest speaker in an Anti-Bias course held at SCSU. Gary also is licensed by the State of Connecticut as a foster and adoptive parent.

Robert Swihart, Ph.D.
Department of Forestry and Natural Resources, Purdue University, West Lafayette, IN 47907
Telephone: (763) 494-3566 Email: rswihart@purdue.edu

Rob conducted undergraduate work at Butler University and Purdue University, obtaining a B.S. in Wildlife Science from Purdue in 1979. He graduated from Minnesota with a M.S. in Wildlife in 1981 and then moved to the University of Kansas to work on a Ph.D. as an Honors Fellow. He received his Ph.D. in Ecology in 1985. In 1986 Rob accepted a position as a research ecologist with the Connecticut Agricultural Experiment Station, where he investigated nonlethal methods for managing crop damage by wildlife in commercial nurseries and orchards. Since joining the faculty at Purdue in 1991, Rob and his students have conducted numerous studies examining the impact of agriculture and habitat loss/fragmentation on vertebrates. Rob has published over 100 manuscripts in scientific journals and served as the Dean of the School Forestry and Natural Resources at Purdue from 2004-2016.

Robert J. Warren, Ph.D.
University of Georgia, Athens, GA 30602
Phone: (706) 542-8356 Email: warren@warnell.uga.edu

Robert J. (Bob) Warren is a Professor Emeritus at the University of Georgia, where he worked as a Josiah Meigs Distinguished Professor in the Warnell School of Forestry and Natural Resources from 1983 until his retirement in 2016. From 1979–1983, he was on the Wildlife Faculty at Texas Tech University. He received a B.S. from Oklahoma State University and M.S. and Ph.D. from Virginia Tech. Bob's research interests included management of wildlife populations in parks and urban/suburban areas, predator ecology and management, and wildlife physiology. He is a Fellow and Past President of The Wildlife Society (TWS) and received the TWS Excellence in Wildlife Education Award in 2013 and the TWS Aldo Leopold Memorial Award in 2014.

Anthony DeNicola, Ph.D.
26 Davison Road, Moodus, CT 06469
Phone: (860) 790-0224 Email: tony@whitebuffaloinc.org

Dr. DeNicola is co-founder and President of White Buffalo Incorporated. In 1988, Tony received a B.S. in Biology from Trinity College of Hartford, CT, and an M.S. from the Yale School of Forestry and Environmental Studies in 1990. He completed his Doctorate work at Purdue University in wildlife ecology in 1996. His dissertation was entitled "Control of reproduction in overabundant white-tailed deer populations". He is a member of the National Animal Damage Control Association, the Society for Conservation Biology and The Wildlife Society. He also is certified as a wildlife biologist (CWB) through the Wildlife Society. He has served as a Board member of the National Wildlife Control Operators Association (NWCOA) and is a member of the AVMA Depopulation Committee. Dr. DeNicola has 40+ publications in reputable scientific journals and has presented at numerous professional conferences. Tony's professional interests are behavioral/ecological approaches to wildlife damage control, wildlife reproductive control, and control of introduced vertebrate species. He has been involved with international research efforts assisting colleagues with capturing endangered Argali Sheep in Mongolia and vultures in Botswana and working with the Royal Government of Bhutan to establish a wild pig management program, and the Japanese Ministry to establish a program to address sika deer overpopulation issues.

Vickie DeNicola
26 Davison Road, Moodus, CT 06469
Phone: (860) 790-0224 Email: vickie.denicola@fieldengine.com

Vickie is the CEO/Founder of Field Engine Wildlife Research & Management, LLC, a Women-Owned Small Business, whose mission is two-fold: 1) to bring products to market that help advantage people and animals in the field, and 2) deliver services that bring solutions to problems associated with human-wildlife conflicts. She has participated in numerous wildlife-related field research and management projects. She is currently a Ph.D. student at the University of Trento C3A/Fondazione Edmund Mach studying the movement ecology of white-tailed deer in suburban environments. Vickie brings a unique perspective to WBI with many years of senior leadership experience from well-known organizations, including The Walt Disney Company, Hasbro, and ESPN, where she was focused on innovation with new technology. Her work was featured in the Wall Street Journal and received 2 Primetime Emmy nominations with one win. Vickie received an M.S. in Environmental Science and Policy from Johns Hopkins University. Her research interests include the use of biologging data to answer questions about animal movement, behavior, and resource usage, as well as the application of technology and techniques to address human-wildlife conflict.

Exhibit F. Curriculum Vitae of Authors

Lauren Dennhardt, PhD
Science Leader, Communicator, and Advocate
https://www.linkedin.com/in/lauren-dennhardt-phd-06852240/

Key Skills

Conservation planning
Fundraising
Grant management
Team building
Restoration projects
Problem solving

Profile

Passionate, ambitious, level-headed leader. Always finds a path forward no matter how challenging the goal. A collaborative leader who is self-aware and able to navigate complexity to reach a desired goal. Adept at building teams, forming collaborations, and creating a vision-based work environment.
Inspiring. Genuine. Battle-tested.

Experience

December 2022-Present
Senior Director of Conservation • Catalina Island Conservancy
Project manager and spokesperson for ongoing Catalina Island Restoration Project (CIRP), which includes deer eradication project. This includes forming political, communications, and science strategy surrounding CIRP. Served on Executive Team and helped guide the organization through extreme change during an 11-month search for a CEO. Served as the organization's tribal liaison. Interviewed by NYT, CBS, NBC National, LATimes, and other organizations effectively. Navigated life in a small town leading a highly controversial project, even while experiencing personal threats. Managed a team of scientists and redirected that team toward Island Restoration by building a landscape-level restoration plan with external partners along with the design of a seed farm for future Island conservation. Restructured the Conservation department to be more effective and built a highly motivated, productive team. Worked with politicians and lobbyists to move our project forward with the state for the first time after decades of unsuccessful attempts. Learned to be a leader in challenging times, refined communications, and underwent extensive executive coaching (by request) to leverage natural communication and leadership skills. Continued serving on Executive Team after CEO started, learned how to bring experienced non-science leaders along in a complex highly evolving space. Continued managing political, communications, and logistics around Island Restoration. Experienced and highly effective at being interrogated in public settings from politicians who don't believe scientists.

November 2020-December 2022
Plant Conservation Manager • Catalina Island Conservancy

Restructured the plant program to achieve more ambitious goals and hired talent that worked well in a team by mentoring young professionals. Built a much more efficient data collection system, drastically improving workflows. Created a rare plant program and plan based on Conservation Standards and raised funds for it in less than three months ($320,000). Conservation Director's co-lead on deer project – organized meetings, brainstormed direction, and project planning. Fundraised for the entire invasive plant program and hired contractors to execute it ($600K). Implemented a $200K data management plan for the conservation department by finding the right talent and providing project structure. Hired and oversaw the rebuild of the Ackermann Native Plant Nursery and started a plant tissue lab on island. Formed concept, project managed, and hired contractors to execute a landscape level restoration plan ($200K). Helped lead effort on plant data standardization on Channel Islands and fundraised for the initial stage.

September 2016-December 2020
Assistant Professor of Science • Valley City State University
Built the plant education classes for the Fisheries and Wildlife program from scratch. Developed a marketing and outreach campaign which doubled enrollment. Mentored undergraduates and led research programs in the summer. Taught GIS, Restoration Ecology, Botany, Plant systematics, Herpetology, Zoology, and Range Management. Developed a program to take students out of state. Faculty member on accessibility committee.

January 2016-May 2016
Adjunct Professor • Concordia College
Taught Evolution & Diversity of Life and Conservation Biology

Other relevant experience
Plant technician in Sequoia National Park, CA. Plant technician for U.S. Fish and Wildlife Service in Morris, MN. Restoration technician for City of St. Paul Environmental Service.

Education

August 2025
Beahrs Environmental Leadership Program • Rausser College of Natural Resources • Berkeley, CA

Competitive Leadership program covering finance, environmental issues, and consensus building.

December 2022
Certificate in Complex Project Management • Berkeley HAAS School of Business • Berkeley, CA

Business class to aid in deer management project

May 2016
PhD in Biology • North Dakota State University • Fargo, North Dakota

Published three of four chapters of dissertation on invasive plant management. President of Biological Student Association. Started a journal club and led social events for graduate students. Awarded both the department teaching and research award. Awarded $60K research grant. Taught Plant systematics. Organized, fundraised for, and implemented a symposium on the Northern Plains. Mentored undergraduates.

May 2011
Bachelor of Arts in Biology and Environmental Studies• University of Minnesota, Morris • Morris, Minnesota
President of Minnesota Public Interest and Research Group, working on environmental and social justice projects with 70-student members. Started and led the Environmental themed residential floor. Worked for the Office of Community Engagement on bridging gap between community and University. Ecology T.A. and tutor.

Publications

Melber, **Dennhardt**, and Vickers. "Evolution of a Space – A Natural Approach to Enhanced Interpretation." Fall 2023. Exhibition – A Journal of Exhibition Theory & Practice for Museum Professionals. 42 (2).

DeKeyser, **Dennhardt**, and Hendrickson. "Kentucky bluegrass (*Poa pratensis L.*) Invasion in the Northern Great Plains: A Story of Rapid Dominance in an Endangered Ecosystem." July 2015**.** Invasive Plant Science and Management. 10.1614/IPSM-D-14-00069.1

Dennhardt, Tennefos, DeKeyser, and Travers. "There is no evidence of geographical patterning among invasive *Poa pratensis* L. populations in the northern Great Plains." January 2017. Weed Science. 10.1614/WS-D-15-00169.1

Dennhardt, Aldrich-Wolfe, Black, Shivega, and Travers. "Forty Years of Increasing Precipitation is Correlated with Loss of Forbs in a Tallgrass Prairie." 2021. Natural Areas Journal. 10.3375/043.041.0305

Certifications
CIC 4-wheel drive trainer, CPR and AED, Wilderness First Aid, ArcGIS, Wildlands Firefighter, College teaching, Qualified Applicator License for training on use of Pesticides in CA, and Federal Remote Pilot.

Relevant Training
Conservation Open Standards through Enduring Conservation Outcomes

Daniel Wehner

linkedin.com/in/danielvwehner

EDUCATION

SUNY College of Environmental Science & Forestry	MS, Environmental & Forest Biology	GPA: 4.00	*Jan 2025 –*
Syracuse, NY		*Anticipated Graduation: Dec 2026*	
Oregon State University	BS, Natural Resources	GPA: 3.99	*May 2019 –*
Corvallis, OR	*Urban Forest Landscapes*	*Summa Cum Laude*	*Dec 2021*

RELEVANT WORK EXPERIENCE

Graduate Teaching Assistant *Jan 2025 – Present*
SUNY College of Environmental Science & Forestry *Syracuse, NY*
- Independently led introductory biology laboratory classes for 20+ students
- Demonstrated proper field and laboratory data collection practices
- Evaluated student assignments, writing, and performance

Graduate Research Assistant *May 2025 – Aug 2025*
SUNY College of Environmental Science & Forestry *Syracuse, NY*
- Conducted a variety of field work on network of northeastern US mountain sites
- Deployed microclimate sensors and seed traps
- Collected plant root specimens for arbuscular mycorrhizal fungi colonization analysis
- Collected soil samples for use as inoculum in greenhouse experiment
- Managed field gear and data collection sheets

Ecological Restoration Project Manager *Aug 2023 – Dec 2024*
Catalina Island Conservancy *Avalon, CA*
- Ensured documentation of all plans, objectives, and activities related to ecological restoration projects
- Represented the organization in public and professional forums, conferences, and community meetings
- Prepared reports, contracts, permit applications, and other documents
- Coordinated with interdisciplinary team and contracted field workers

GIS Program Manager *Jun 2022 – Jul 2023*
Catalina Island Conservancy *Avalon, CA*
- Provided GIS support, data management, and analysis for the organization
- Produced species distribution models using Maxent software
- Developed standardized data collection fields for rare plant occurrences across the Channel Islands
- Created detailed maps for projects, grants, presentations, board meetings, and reports

Restoration Technician *Mar 2022 – May 2022*
Catalina Island Conservancy *Avalon, CA*
- Removed invasive plant species through chemical and manual methods
- Collected seed, propagated, and planted native plants
- Supported studies on plant composition at deer exclosure sites
- Identified native and invasive plants of the California Channel Islands using dichotomous key

Natural Resource Assistant *May 2021 – Feb 2022*
Monmouth County Park System *Middletown, NJ*
- Conducted surveys of plant communities for deer exclosure and forest health studies using established protocols
- Identified native and invasive plants of the northeastern US using dichotomous key
- Maintained accurate records, updated existing inventory of resource data, and drafted reports
- Analyzed environmental data using R to determine statistical trends and significance

Assistant Naturalist *Oct 2018 – May 2019*
Monmouth County Park System *Middletown, NJ*
- Led educational programs on local ecology and natural history for school groups
- Provided guidance to visitors of 380-acre park through exhibits of historic environmental center
- Interpreted natural resource topics to school age children during outdoor recreation programs

AWARDS & HONORS

BSA Bill Dahl Graduate Student Research Award	*2025*
New York Flora Association Research Grant	*2025*
Lowe-Wilcox Graduate Scholarship	*2025*
Natural Resources Ecampus Outstanding Student Award, OSU	*2022*
Honor Roll, Oregon State University	*Summer 2019 – Fall 2021*
Dean's List, Marymount Manhattan College	*Fall 2016*
Dean's List, Brookdale Community College	*Fall 2014 – Spring 2016*
NJ Student Tuition Assistance Reward Scholarship (NJ STARS)	*2014*

PRESENTATIONS

Dennhardt L, and **Wehner D.** 2023. Restoration on Santa Catalina Island – past, present, and future. California Islands Symposium, Ventura CA.

LICENSES & CERTIFICATIONS

Conservation Project Management & Design	*Conservation Careers*	*Jan 2024*
Certified Associate Ecologist	*Ecological Society of America*	*Dec 2023*
Boating Safety Certificate	*State of New Jersey*	*Jun 2012*

SKILLS & TRAINING

Field data collection
Data management & analysis
Plant identification
Plant materials collection
Invasive plant management
Restoration planting management
4WD & hiking on rugged terrain
Microsoft Office & Google suites
Grant & report writing
Teaching & presenting
Communicating with public
GIS & ESRI products
Python and R programming languages
MaxEnt modeling

Aaron Kreisberg

akberg90@gmail.com | +1 (805) 679-1578 | Avalon, CA | LinkedIn

EDUCATION

Master of Environmental Science and Management (June 2022)
Bren School of Environmental Science & Management – University of California, Santa Barbara (UCSB)
Specialization: Conservation Planning | Focus: Strategic Environmental Communication & Media
Courses: Landscape Ecology, Conservation Planning, Biological Community Survey/Analysis, CEQA/NEPA

Bachelor of Science, Hydrological Sciences & Policy | Bachelor of Arts, History of Public Policy (June 2012)
University of California, Santa Barbara (UCSB)
Emphasis: Policy | Senior Thesis: The Williamson Act—Protecting California's Agricultural Heritage

RESTORATION & MANAGEMENT EXPERIENCE

Invasive Plant Program Manager (7/24–Present) | Plant Conservation Manager (5/23–7/24)
Catalina Island Conservancy, Avalon, CA

- Manage invasive plant program, including 3+ staff, contractors, conservation corps crews, and volunteer workers in management, control, removal, survey, and monitoring of invasive plants on Catalina Island
- Continually strive for excellence in invasive plant management, interpersonal relations with supervisors, direct reports, crews, colleagues, and community members while stewarding the biodiversity of Catalina
- Engage professionally and productively with the wider invasive plant management community through groups such as the Islands of the Californias Botanical Collaborative, Los Angeles County Weed Management Area, California Native Plant Society, and California Invasive Plant Council

Staff Ecologist (4/22–Present) | Volunteer (10 trips, 10/13–10/19) | Restoration Technician (4/20–8/20)
Channel Islands Restoration, Santa Barbara, CA

- Write grants and project proposals, conduct research and monitoring for conservation and restoration projects, maintain professional relationships with clients, partners, and regulators, and conduct biological assessments and surveys
- Conducted treatment and removal of non-native species, including noxious weeds including star-thistle (*Centaurea*), giant reed (*A. donax*), and Tamarix, for multiple projects across Santa Barbara, Ventura, and Los Angeles counties
- Completed restoration fieldwork on 10 volunteer trips, including Tamarix removal in Sisquoc/Santa Ynez River backcountry and trips to Santa Rosa Island, San Nicolas Island, Anacapa Island, and San Marcos Foothills Preserve

Graduate Student Researcher – La Kretz Center, Sedgwick Reserve, CA (10/21–6/22)

- Conducted vegetation monitoring for a planned prescribed fire at Midland School in Santa Ynez Valley, including vegetation line intercepts for species and fuel loads and using a densiometer to estimate canopy cover
- Participated in preparation and field surveys for SHIFT remote sensing campaign lead by the Jet Propulsion Laboratory centered on Sedgwick Reserve and the Nature Conservancy's Dangermond Preserve
- Collected field samples of vegetation, monitored functional traits, and prepared hundreds of samples for analysis and transport, including preparing samples by drying in an oven and freezing with liquid nitrogen

Watershed Restoration Intern – South Coast Habitat Restoration, Carpinteria, CA (6/21–9/21)

- Created plant palette in collaboration with project manager for 5 restoration sites in Carpinteria watershed that were impacted by catastrophic debris flows, collaborating with Santa Barbara Natives to purchase 700 plants
- Conducted California Rapid Assessment Methodology Assessment (CRAM) for riparian habitat in Los Padres National Forest as team of 3; completed night survey for three special status species as member of team of 6.

Habitat Restoration Manager (1/14–6/18) | Board Member (5/15–9/18, 6/21–6/22)
Santa Barbara Audubon Society, Santa Barbara, CA

- Monitored local conservation issues on Conservation & Science Committee; host talks as Programs Co-chair
- Planned, developed, obtained grant funding, and monitored 2.5-year Dune Swale Pond Fire Recovery Project, a $35,000 budgeted habitat restoration project of 6 acres mitigating wildfire impacts at Coal Oil Point Reserve
- Oversaw interns and volunteers in removing *B. nigra, F. vulgare,* and *D. odorata* exotic species, planting native species to enhance wetland function and habitat quality, and vegetation monitoring for 20+ workdays

Island Manager (8/17–11/19) | Tour Guide (3/13–11/19, 6/20–6/21)
Santa Barbara Adventure Company, Santa Barbara, CA

- Managed 20+ employees for guided kayaking concession in Channel Islands National Park on Santa Cruz Island
- Maintained relations and communicated with National Park Service (NPS) and Island Packers transportation staff. Upheld standards for risk management, natural and cultural history interpretation, and customer service

ADDITIONAL FIELDWORK EXPERIENCE

-Environmental Field Technician – Wildlands Conservation/ManTech SRS Technologies, Inc., Lompoc, CA (11/16–3/17)
-Restoration Intern (9/10–3/11) | Student Worker (4/11–2/13) | Laboratory Assistant (8/12–2/13) Cheadle Center for Biodiversity and Ecological Restoration (CCBER), UCSB, Santa Barbara, CA
-Working Holiday, New Zealand (11/19–3/20)

CERTIFICATIONS & SKILLS

Certifications: Wildland Fire Fighter Type 2, FAA Part 107 Licensed UAV Pilot, Qualified Applicator License (Exp. 12/26), Wilderness First Responder (Exp. 6/26), CA Driver License (Exp. 7/27)
Skills: Microsoft Office, Google Earth & Suite, Zoom, ESRI platform/GIS, R, Data Visualization, Plant Ecology & Botany

COURSES & PRESENTATIONS

Courses: Fundamentals of Remote Sensing – NASA Applied Remote Sensing Training Program (11/25), California Native Plant Society Plant Identification Class (7/25), Jepson Herbarium Flora of the San Jacinto Mountains (7/2025), Jepson Herbarium Cacti of Anza Borrego (4/25), Santa Barbara Training and Exchange Prescribed Burn Training (11/24), Leadership Principles Certificate – Harvard Business School Online (10/24), Conservation Project Management & Design (9/24), Grasses of California (4/23)
Presentations: Early Detection, Rapid Response, and Invasive Plant Management on Santa Catalina Island (North America Invasive Species Management Association Conference, 11/25), Riding the Invasion Curve: Invasive Plant Management on Santa Catalina Island (California Invasive Plant Council Symposium, 11/24)

Kevin Alison

Summary

Skilled Horticulturist and Restoration Ecologist focused on conserving the native biodiversity on Catalina Island.

Core Skills & Expertise

- Catalina Landscape Ecology
- Leadership & management
- Technical field work
- Laboratory management
- Project planning & adaptive management.
- Public speaking & communication

Education

Master of Science - University of California Irvine **Sept. 2018 - June 2020**

Conservation and Restoration Science

Bachelor of Science - University of Hawaii at Hilo **Aug. 2012 – Dec. 2014**

Coastal Resources and Watershed Management
Minor: Cell and Molecular Biology

Certificates:

- Forest Resource Management and Conservation
- Plant Tissue Culture

Associate of Science (Two)**-** College of the Desert **Sept. 2010 - May 2012**

Environmental Horticulture Natural Resource Management

Additional Certificates:

- Arborist technician
- Landscape and Irrigation Technician
- Pest Management Technician
- Desert Naturalist

Professional Experience

Native Plant Conservation Manager **May 2024 - Present**
Rare Plant Ecologist **August 2022 – May 2024**
Catalina Island Conservancy – Avalon, CA

- Lead plant scientist conserving the flora of Santa Catalina.
- Develop and manage the rare plant program focused on preventing rare and endangered plant extinction.
- Strong engagement with the scientific community providing collaboration and educational presentations.
- Provide development with content for social media platforms.

- Lead wildflower and conservation tours into the interior of the island.

Production & Research Manager — Sept. 2015 – August 2022

Tree of Life Nursery – San Juan Capistrano, CA

- Oversee large-scale production of California native plants for restoration and horticulture.
- Established and maintained best management practices (BMPs) for plant disease and pests.
- Detailed propagation and accession records of seed and cutting material.
- Established and maintains a research laboratory focused on the development of efficient propagation protocols of rare, endangered, and difficult-to-grow species using traditional and contemporary methods, such as *in-vitro* plant tissue culture.
- Developed native fern production protocols.
- Beneficial soil microbe production to be used as soil inoculant for improved crop quality and disease prevention.
- Performed effective outreach to create and grow native plant interest.
- Lead and provided lectures on natural history, horticulture, and maintenance of native plants.
- Provided expert consultation of restoration, ex-situ gardens, and rare species propagation.

Board of Directors Member – Plant Science Committee — Jan. 2021 - Present

California Native Plant Society - Orange County Chapter

- Plan, reviews, and discuss initiatives of conservation, preservation, education, and horticulture of California native plants locally in Orange County.
- Oversee grant submissions, review, and funding for plant research, conservation, education, and horticulture projects.

Lead Horticulturist — Dec. 2014 – Sept. 2015

Disneyland Resort - Anaheim, CA

- Lead a team of professional horticulturists to perform high-quality installation and maintenance of large and diverse landscapes (including native) throughout the resort.
- Ensured proper use, maintenance, and sterilization of landscape equipment with a focus on safety and sanitation.
- Received and inspected incoming plant material to be planted throughout the resort for pathogen and disease and maintained high-quality control.

Assistant Garden Manager — Aug. 2012 – Dec. 2014

Univ. of Hawaii at Hilo Botanical Garden - Hilo, HI

- Upheld educational and *ex-situ* conservation gardens focused on native, cultural, and biologically important species to successful botanical garden standards.
- Achieved successful integrated pest management through efficient cultural practices, accurate invasive species identification and control, and encouraged beneficial organisms.
- Maintained effective greenhouse operations, propagation, equipment maintenance and sanitation.

Volunteer Technician — July 2012 – May 2014

U.S. Forest Service: Institute for Pacific Island Forestry **–** Hilo, HI.

- Established and maintain research plots in lowland tropical wet forest on the Big Island, HI.
- Monitored and assessed plant establishment and recruitment of native and non-native plant species.
- Processed and analyzed litterfall and of seed viability of keystone species.
- Performed installation and maintenance of native species to sufficient establishment.

- **Biology Intern** **June 2011 – Aug. 2011**

American Conservation Experience (ACE) - El Centro, CA.

- Record physiological and environmental measurements for the Bureau of Land Management's conservation efforts of the Flat-Tail Horned Lizard.
- Monitored diverse habitats throughout the Southern Colorado Desert of California.
- Developed a native plant reference manual for the department and future interns.

- **Propagation & Nursery Associate** **Dec. 2010 – June 2012**

The Living Desert Zoo & Botanic Gardens - Palm Desert, CA

- Propagated a wide selection of desert plants, including rare and endangered species, for gardens, *in-situ,* and *ex- situ* conservation.
- Provided sales and customer service to the public with the focus on promoting native plant use and water conservation.

Public Speaking Presentations

- "A Calendar of Color: The Art and Science of Catalina's Flora" – Last Friday Lecture Series, Catalina Island Conservancy.
- "Micropropagation of Catalina Island's Rarest Plants" – Center for Plant Conservation, SD Zoo.
- "Plant Clones for Conservation" – The Natural History Museum of Los Angeles
- "Propagating Catalina's Rarest Plants" – Last Friday Lecture Series, Catalina Island Conservancy.
- "Saving the Catalina Island Mountain Mahogany" – Islands of California Botanical Collaborative.
- "Plant Babies: Propagating Native Plants" – California Native Plant Society
- "Micropropagation of Catalina's Rarest Plants" – Channel Islands Restoration
- "Plants of Catalina Island" – California Native Plant Society
- "Preventing Plant Poaching & Extinction: Conservation Strategies for *Dudleya*" – UCLA
- "Plants of the Channel Islands" - Tree of Life Nursery
- "Create and Caring for a Native Plant Garden" - Tree of Life Nursery
- "California Native Plant Propagation" – California Native Plant Society, Orange County
- "The Use of Beneficial Microbes in Nursery Production" – Dominican University of Californica
- "Our Plant Choices Matter: The Importance of CA Native Plants" – California Garden Clubs
- "Conservation Through Cultivation" California Native Plant Society, San Diego Chapter
- "The California Coastal Garden" California Native Plant Society, South Coast

Awards

- California Native Plant Society- Charlie O'Neill Research Grant 2020
- Palms Garden Club Scholarship 2011-2012
- Voth Family Fellowship 2019-2020

Rachel Boyce

EXPERIENCE

Oregon Department of Fish and Wildlife – *Springfield, OR*

- **Fish Technician**, July 2025 – December 2025
  - Assisted in population monitoring and life history attributes evaluation of the ESA listed bull trout.
  - Conducted night-snorkeling surveys and redd surveys.
  - Installed and maintained video weirs, rotary screw traps, and remote PIT tag antennas.
  - Captured bull trout by operating screw traps and angling.
  - Implanted PIT tags using both injection and incision methods.
  - Handled and identified freshwater fish.
  - Used Garmin GPS devices for field data collection and navigation.

University of Washington – *Tinian Island, MP*

- **Research Technician**, May 2024 – December 2024
  - Conducted territory mapping research using radio telemetry.
  - Banded 20 Tinian monarchs, a currently vulnerable and previously endangered species.
  - Deployed 15 telemetry units on Tinian monarchs using glue.
  - Handled over 50 birds across 10 species, including rare and endemic species.
  - Deployed and positioned mist nets, surveyed nests, and identified nests.
  - Identified and resighted color-banded birds with binoculars.
  - Deployed and monitored acoustic recorders, later analyzing the recordings and identifying birds by song.
  - Deployed and monitored camera traps and chew cards for detection of invasive predators, later identifying bite marks.
  - Used Garmin GPS devices for field data collection.
  - Used ArcGIS Pro and Garmin BaseCamp to produce maps for daily field activities, data collection, and use in reports.
  - Presented at public meetings and collaborated with landowners for research activities on private properties.

Catalina Island Conservancy – *Catalina Island, CA*

- **Restoration Ecologist**, July 2023 – May 2024
  - Managed, designed, planned, implemented, monitored, and maintained restoration projects.
  - Used ArcGIS Pro and ArcGIS Online to produce maps for daily field activities, data collection, and use in reports.
  - Managed and produced grant reports and proposals.
  - Oversaw maintenance of equipment/field gear, vehicles, and project base yard (including proper storage of herbicides).
- **Lead Plant Technician**, November 2022 – July 2023
  - Led, scheduled, and managed about 20 field and nursery workers for the Conservancy's Plant Program.
  - Directly monitored field staff to ensure completion of invasive plant management, restoration projects, and surveys.
  - Trained all field staff and volunteers in standard operating procedures for all programmatic operations.
  - Managed, monitored, and maintained fenced deer exclosures.
- **Field Associate**, June 2022 – November 2022
  - Led field and nursery workers for the Conservancy's Plant Program.
  - Led native/invasive plant surveys, vegetation monitoring, invasive plant removal, and restoration project maintenance.
  - Assisted in training field staff and volunteers on standard operating procedures for all operations.
  - Ensured proper use of personal protective equipment and safety in the field.
- **Restoration Technician**, March 2022 – June 2022
  - Conducted invasive plant management in the field, using manual and chemical methods.
  - Collected data, using Field Maps, and plant materials such as seeds, tissue samples, vouchers, and cuttings.
  - Conducted vegetation plot and transect surveys, measuring quantity and abundance of native and invasive plants.
  - Conducted office administrative tasks including photo management, data entry, data proofing, and inventory.

Ohio Center for Ecological and Evolutionary Studies – *Ohio University, Athens, OH*

- **Research Technician**, September 2020 – May 2021
  - Assisted in studies on parental provisioning in Hooded Warblers, Eastern Bluebirds, and Tree Swallows.
  - Organized, quantified, and input wildlife video data in Microsoft Excel.
  - Sexed and identified birds and invertebrate feed species to determine quality and quantity of feed.
  - Assisted in positioning mist nets and handling birds for bird banding.
- **Field Assistant**, August 2020 – October 2020
  - Assisted in studying phylogeography of Northern ravine salamanders and Red-backed salamanders.
  - Conducted transect habitat surveys in Wayne National Forest.
  - Collected environmental data such as: soil moisture, soil temperature, canopy cover, humidity, and leaf litter depth.
  - Captured salamanders along transects, recorded sex, size using a caliper, and coordinates using Trimble GPS unit.

EDUCATION

Bachelor of Science in Wildlife and Conservation Biology – *Ohio University,* August 2018 - December 2021
GPA of 3.53
Dean's List: Fall 2019, Fall 2020, Spring 2021 and Fall 2022
Awards: OHIO Trustee Award, OHIO Pathway Scholarship, OHIO Success Scholarship
Relevant Courses: Field Ecology, Ornithology, Mammalogy, Animal Conservation Biology, Animal Ecology, Plant Ecology

SKILLS

Field Research:

- Off trail hiking on rugged terrain while carrying large packs in all weather conditions
- 4WD on steep, rocky, muddy, uneven terrain
- Bird banding
- Radio telemetry tracking
- PIT tagging
- Wildlife handling

Software:

- ArcGIS (Pro, Online, and Field Maps)
- Microsoft Office (including Access)
- Garmin BaseCamp
- RStudio
- Image J

John Joseph Knapp

PROFESSIONAL OBJECTIVE

Advance conservation science to improve island ecosystems

EDUCATION

Master of Science in Agriculture, California Polytechnic State University San Luis Obispo, 2005. Specialization: Invasive Plant Ecology. Thesis title- *Catalina Island Invasive Plant Ranking Plan.* Synopsis- developed and implemented a landscape-scale ranking system to prioritize invasive plant management strategies.

Bachelor of Arts in Physical Geography, University of California at Santa Barbara, California, 1998. Concentration: Ecology, and Atmospheric and Oceanographic Interactions

WORK EXPERIENCE

Senior Conservation Scientist (9/25 to present), Catalina Island Conservancy, Avalon, CA

Serves as a lead scientist in co-developing priorities and implementing landscape-scale restoration across the Island. Conducts monitoring and surveys for endemic and listed plants and vegetation change associated with restoration activities. Provides technical writing for project scoping, permitting, implementation, and reporting.

Senior Island Scientist (08/2013 to 3/2025), The Nature Conservancy, Ventura, CA

Served as a science lead in setting conservation priorities, and developing and exporting conservation tools, methodologies, and strategies. Developed and strengthened key relationships with partner entities- primarily with the U.S. Navy, National Park Service, and local non-governmental organizations (NGOs). Served as lead author in the development of the Santa Cruz Island Ecological Management Strategy 2015-2025 which is the primary document for setting conservation objectives for the Santa Cruz Island Preserve. Led the development of a binational collaboration (Islands of the Californias Botanical Collaborative) between 20 plus NGO's, county, state, and federal agencies, research institutions, and for-profit companies to identify threats and conservation priorities, secure funding, and implement joint projects. Secured over $4 million dollars in state, federal, and private foundation grants and from private donors to date. Managed an annual operating budget ranging from $150,000-$500,000. Conceptualized and managed three key programs: Invasive Plant Eradication (second largest in the world), Extirpated Plant Reintroduction, and Plant Extinction Prevention. Produced gray literature to scientific publications annually. Represented TNC and exported novel conservation tools, strategies and methodologies at major conservation conferences.

Conservation and Research Advisory Committee Member (08/2013 to 01/2016), Santa Barbara Botanic Garden, Santa Barbara, CA

Served on a committee of researchers, scientists and land managers from local entities to quarterly evaluate the conservation and research strategies and programs, and advise changes in direction, scope, and timing as it related to the Santa Barbara Botanic Garden mission and the current state of conservation and research.

Director (01/2008 to 08/2013), Native Range, Inc., Lompoc, CA

Conceptualized and co-established Native Range, Inc., a for-profit conservation consulting firm, provide cost-effective ecological services such as: flora and fauna surveys, invasive plant management, management plan development. Developed novel methods to manage invasive plants. Served as the lead contact for all clients and developed project bids, served as lead scientist and project principle, and managed a staff of up to eight biologists. Secured over $600,000 in grant proposals for client projects. Managed an annual budget of $500,000.

Invasive Plant Program Manager (06/2004 to 01/2008), Catalina Island Conservancy, Avalon, CA

Developed the Conservancy's first official invasive plant management program and established program priorities. Developed and implemented the first invasive plant management plan for the island, which was the most ambitious invasive plant eradication program in the world at the time. Co-developed a watershed ranking priority system and served as lead-author in the development of the plan. Secured over $1.4 million dollars in corporate, private foundation, and county, state, and federal grants. Managed a $500,000 annual budget. Forged partnerships with research institutions, non-profit organizations, Federal and State agencies, & youth conservation corps. Developed & delivered presentations at symposia, schools, community groups, and state agencies. Managed an extensive GIS database, identified restoration site, and mapped over 40,000 invasive & rare plant populations. Purchased & maintained equipment and conducted general administrative duties.

Board Service (01/2006 to 01/2016), California Invasive Plant Council, Berkeley, CA

Served as: **Past President** (01/2015 to 12/2016), **President** (1/2012 to 2014), **Vice President** (01/2010 to 12/2011), **Board Secretary** (01/2008 to 12/2009), **Board Director** (01/2006 to12/2007)

Oversaw adherence to the mission and fiduciary responsibilities and lead organizational strategic planning. Served as chair of the Steering, Board Development and Fundraising Committees, and served on the Finance and Symposium Committees. Assisted in hosting ten statewide annual symposia. Organized and hosted Southern California Regional Weed Inventory workshops and provided assistance with invasive species ranking and outreach projects to partners throughout the state. Collaborated in the development of Statewide invasive plant species maps and provided assistance with invasive species inventories.

Board Director (01/2004 to 12/2005), Southern California Botanists, Claremont, CA

Served as Board Director. Contributed to the adherence to mission goals and fiduciary responsibilities, and contributed to the production of an annual symposium, botanical hikes, and journal publication.

Coordinator of Volunteers (02/2001 to 10/2002), Catalina Island Conservancy, Avalon, CA

Recruited, coordinated, & supervised community group volunteers conducting a variety of restoration projects such as: seed collection, cleaning, and processing, outplanting, invasive plant treatment, and wildlife surveys. Managed the world-renowned Volunteer Vacations Program. Maintained a volunteer database tracking volunteer hour, interests, and recognition.

Charter School Teacher (05/99 to 01/2001), Los Angeles Conservation Corps Charter High School, East Los Angeles, CA

Educated under-served young adults (ages 18-24) about environmental science & ecology. Developed curricula for a nationally recognized & awarded environmental education program. Instilled in corps members a strong work ethic & love for nature. Successfully adapted to an ever-changing schedule and teaching environment. Established working partnerships with local

community groups. Assisted in corps member training & development. Coordinated recycling presentations & work projects at middle schools. Served as a representative to the National Parks and Conservation Association.

ADDITIONAL EXPERIENCE, SKILLS, AWARDS, PROFESSIONAL AFFILIATIONS, AND SELECT PRESENTATIONS PUBLICATIONS

Computer programs
•Microsoft Office •ESRI Geographic Information System •Trimble, Garmin, and smartphone application global positioning systems

Professional Organizations
•California Invasive Plant Council •California Native Plant Society •California Society for Ecological Restoration •California Weed Science Society •Ecological Society of America •Society of Conservation Biology •Southern California Botanists •Grupo de Ecología y Conservación de Islas

Professional Awards
•2025 California Invasive Plant Council Jake Sigg Award for Vision and Dedicated Service

Select Professional Presentations
Delivered over 50 presentations at professional conferences and symposia, professional societies, universities, and community groups: including: California Invasive Plant Council, California Department of Fish and Wildlife, Society of Conservation Biology, Ecological Society of America, Society of Ecological Restoration, Los Angeles and San Gabriel Rivers Watershed Council, California Weed Science Society, University of California Santa Barbara, California Native Plant Society, Island Invasives Eradication Conferences (New Zealand and Scotland), Southern California Academy of Science, California Islands Symposia, United States Department of Fish and Wildlife, Wild Pig Conference, International Oak Society, Conservation de Islas (Mexico), The Nature Conservancy Science Conference, Global Conservation Consortium: Oaks, California Native Plant Society, city Rotary, and local yacht clubs and K-12 schools.

Select Publications
Boser, C.L., C. Cory, K.R. Faulkner, J.M. Randall, J.J. Knapp, and S.A. Morrison. 2012. Strategies for biosecurity on a nearshore island in California. 8th California Islands Symposium.

Cory, C. and J. J. Knapp. 2012. The Nature Conservancy's Program to eradicate 25 invasive plant species from Santa Cruz Island. Proceedings of the 8th California Island Symposium. Ventura, CA.

Hoyer CA Is. Symposium

Knapp, D.A. and J. J. Knapp. 2005. Ecosystem protection through watershed-level prioritization on Catalina Island. Pp. 39-46 In: G. Skurka, (ed.). Proceedings of the California Invasive Plant Council symposium, Volume 9. Berkeley, CA.

Knapp, D.A., D. Borhes-Flores, P. Dixon, W. Hoyer, J.J. Knapp, L. Luna-Mendoza, K. McEachern, J. Hernandez-Montoya, B. Munson, P. Power, and J.M. Randall. 2017. The future of California Islands conservation in a changing world. J.J. Knapp and M. Kaufmann (eds) In: Special Issue: Islands of the Californias, Fremontia. 45:3, 44-45 p.

Knapp, J. J. 2004. Catalina Invasive Plant Ranking Plan for Santa Catalina Island. Unpublished plan prepared for the Santa Catalina Island Conservancy. Avalon, CA. 160 p.

Knapp, J. 2007. Lessons from Catalina Island: managing invasive plants before and after a fire. Pp. 12-16 In D. Ready (Editor). Watershed Wise- the fires this time: post-fire recovery best practices.

Knapp, J. J, C. Cory, R. Wolstenholme, and S. Chaney. 2007. Santa Cruz Island Weed Management Strategy. Unpublished report prepared for The Nature Conservancy and Channel Islands National Park. Ventura, CA. 120 p.

Knapp, J. J. 2008. Draft Catalina Island Invasive Plant Management Plan. Unpublished report prepared for the Catalina Island Conservancy. Avalon, CA. 150 p.

Knapp, J.J., C. Cory, R. Wolstenholme, K. Walker, and B. Cohen. 2008. Santa Cruz Island Invasive Plant Species Map. In the 7th California Islands Symposium proceedings.

Knapp, J. J. 2010. Catalina Island's invasive plant management program, with an emphasis on invasion and protection of oak ecosystems. In: D. Knapp, (Ed.). Proceedings of the Catalina Island Oak Conference, Volume 1.

Knapp, J. J., P. T. Schuyler, K. N. Walker, N. L Macdonald, and S. A. Morrison. 2010. Benefits of supporting invasive plant and animal eradication projects with helicopters. Pages 188-191. In: Veitch, C.R.; Clout, M.N. and Towns, D.R. (eds.), *Island Invasives: eradication and management.* Proceedings of the International Conference on Island Invasives. Gland, Switzerland. IUCN and Auckland, New Zealand: CBB. Xii +542 pp.

Knapp, J.J., D.J. Knapp, and M. White. 2011. Tejon Ranch Invasive Plant Management Plan. Unpublished report prepared for the Tejon Ranch Conservancy, Frazier Park, CA 80 p.

Knapp, J.J. and M. Kaufmann (eds.). 2017. Special Issue: Islands of the Californias. Fremonita. 45:3, 53 p.

Knapp, J.J. and J.M. Randall. 2017. Introduction to this special issue on the flora and vegetation of the islands of the Californias. J.J. Knapp and M. Kaufmann (eds) In: Special Issue: Islands of the Californias, Fremontia. 45:3, 53 p.

Mazurkiewicz, D., J. Adams, M. Ball, Ryan Carle, P. Dixon, K. Flagg, E. Havstad, E. Howe, Bill Hoyer, J.J. Knapp, K. McEachern, L. Luna-Mendoza, B. Munson, K. Niessen, K. Owen, J. Parish, P. Power, A. Yamagiwa, and A. Little. 2017. Restoration and protection of the archipelago's flora and habitats: a new era. J.J. Knapp and M. Kaufmann (eds) In: Special Issue: Islands of the Californias, Fremontia. 45:3, 37-43 p.

McEachern, K., P. Dixon, E. Havstad, W. Hoyer, D. Knapp, J.J. Knapp, L. Luna-Mendoza, B. Munson, and H. Schneider. 2017. J.J. Knapp and M. Kaufmann (eds) The Struggle for Recovery. In: Special Issue: Islands of the Californias, Fremontia. 45:3, 32-36 p.

SASHA GANNON

EDUCATION

Clark University, Worcester, MA *May 2025*
M.S. in Geographic Information Science Concentration in
Conservation & Wildlife Biology Overall GPA: 3.93

Clark University, Worcester MA *May 2024*
B.A. in Geography, *summa cum laude*
Concentration in Geographic Information Science & Earth Systems Science
Minors: Global Environmental Studies, International Development and Social Change Overall GPA: 3.83

School for Field Studies, Paro Bhutan *August 2022-December 2022*
Study Abroad Field Work and Research Program Concentration
in Mountain Ecology and Wildlife Monitoring Overall GPA: 3.9

PROFESSIONAL EXPERIENCE

Ecological Restoration Project Manager June 2025-Current
Catalina Island Conservancy

- Manage all GIS, spatial data, and geodatabase systems for the Conservancy's Conservation Department.
- Lead department-wide data management: data standards, QA/QC, workflows, storage, and documentation.
- Produce clear maps, dashboards, and data summaries for managers, partners, and grant reporting.
- Perform remote sensing analysis using multispectral, LiDAR, and high-resolution imagery to support vegetation mapping, habitat assessments, and restoration planning.
- Build custom GIS tools, mobile data-collection forms, and workflow solutions to streamline field operations and monitoring efforts.
- Join field crews as needed to support surveys, restoration treatments, data collection, and on-the-ground problem solving.
- Write clear technical reports, monitoring protocols, and grant materials that translate complex spatial and ecological data into practical guidance for teams and partners.

Transportation Planning GIS Co-op January 2023-August 2024
Massachusetts Department of Transportation, Office of Spatial Analysis and Research

- Contributed to the development and maintenance of spatial databases and analytical tools, supporting transportation planning and geospatial data management.

- Assisted in overseeing and coordinating multi-year projects, including advanced geospatial analyses and custom applications, in collaboration with external consultants and vendors.
- Produced and updated comprehensive reports and technical documentation, improving the clarity and utility of GIS applications for ongoing transportation planning initiatives.

RESEARCH EXPERIENCE

Graduate Researcher August 2024- May 2025
Clark University, California State University Long Beach

- Designed and implemented a master's research project assessing River Ridge Ranch as an ecological corridor through resistance modeling and wildlife monitoring.
- Conducted extensive fieldwork, including deploying and maintaining camera traps, to collect data on wildlife presence and movement patterns.
- Integrated remote sensing, spatial modeling, and field observations to analyze habitat connectivity and support evidence-based land management strategies.

Undergraduate Consultant January 2024-May 2024
Earth Insight

- Developed a Google Earth Engine code for Earth Insight to assess the expansion of a nickel mining company in Guatemala beyond its concession area.
- Conducted analysis of land change and deforestation using Landsat data, quantifying yearly and overall forest loss.
- Provided insights on environmental impact and compliance, contributing to the organization's understanding of deforestation trends related to mining activities

Undergraduate Researcher August 2024- December 2024
Clark University, Geography Department

- Worked on a team of undergraduate students supervised by Dr Florencia Sangermano to assess the effectiveness of ecosystem services in mitigating the Urban Heat Island (UHi) effect in Cordoba, Argentina using the InVEST Urban Cooling model
- Integrated socioeconomic data to analyze the relationship between urban heat mitigation and social vulnerability, identifying neighborhoods with the highest susceptibility to extreme heat.
- Applied advanced spatial analysis techniques, including space-time cube and emerging hot spot analysis, to detect and visualize temperature changes and anomalies.

Undergraduate Researcher August 2022-December 2022
School for Field Studies Bhutan

- Directed research on the spatial distribution of large felids across elevational gradients and forest types in the Eastern Himalayas, in collaboration with the Bhutan Department of Forestry and the Bhutan Ecological Society
- Utilized camera trap data and geospatial technology to map distribution patterns and assess wildlife populations in various ecosystems.
- Conducted fieldwork, including camera trapping and biodiversity surveys, to evaluate ecological health and explore conservation strategies oriented toward large felids.

RESEARCH INTERNSHIPS & FELLOWSHIPS

NASA DEVELOP Project Lead September 2024- December 2024

NASA DEVELOP, Fort Collins Colorado

- Collaborated with the Pueblo of Santa Ana Department of Natural Resources to support rangeland monitoring and grazing management using NASA Earth Observations.
- Analyzed trends in bare ground cover and herbaceous biomass productivity from 1985 to the present using the Rangeland Analysis Platform.
- Utilized long-term field data to evaluate and interpret satellite-derived products, identifying trends relative to management history and vegetation type.

Graduate Research Assistant May 2024-July 2024

NSF REU: Tracking Land Change, California State University Long Beach

- Supported Dr. Mystyn Mills in investigating the effectiveness of remote monitoring techniques to assess anthropogenic impacts on wildlife in working landscapes, with a focus on the Sierra Nevada Foothills.
- Initiated and contributed to a master's thesis project evaluating River Ridge Ranch as an ecological corridor using remote sensing and camera trap analysis, aimed at understanding wildlife movement and habitat connectivity.
- Managed the deployment and data collection of camera traps for wildlife monitoring

Undergraduate Research Assistant May 2023-July 2023

NSF REU: Tracking Land Change, California State University Long Beach

- Conducted spatial, behavioral, and dietary analysis of the California Ground Squirrel for the Tracking Land Change (TLC) project at River Ridge Ranch.
- Applied geospatial technologies and biogeographic concepts to study population dynamics, utilizing conservation drones and GPS technology for data collection.
- Analyzed data using geospatial and statistical software, identifying spatial patterns and behavioral trends

Undergraduate Research Assistant June 2022-August 2022

NSF REU: Spatial Models & Electoral Districting, University of Washington Tacoma

- Developed and implemented a population and contiguity-constrained algorithm to redistrict electoral districts based on travel time metrics.
- Worked within a subgroup of 6, specializing in the analysis of electoral districting through travel time, as part of a larger interdisciplinary team of 12.
- Cleaned and analyzed U.S. Census data, using GIS, R, and Python to assess demographic, geographic, and voting patterns, identifying statistical outlier districts based on travel time.

TEACHING AND MENTORING EXPERIENCE

Science Educator January 2025-May 2025

EcoTarium Museum of Science and Nature

- Educated diverse audiences on wildlife conservation, astronomy, and environmental science through interactive overnight programs and hands-on activities.
- Led engaging wildlife tours featuring rescue animals, fostering public awareness of species conservation and care.

GIS Help Desk Assistant September 2024-May 2025

Clark University Geography Department

- Mentor undergraduate students in GIS by providing guidance on assignments, labs, and projects, enhancing their practical skills and understanding.
- Troubleshoot and resolve technical issues related to vector and raster GIS and remote sensing, ensuring smooth workflow for students.
- Facilitate student comprehension and application of GIS and remote sensing concepts and tools, supporting their academic and research needs.

Graduate Mentor, NSF REU: Tracking Land Change Summer 2024

California State University Long Beach

- Guided undergraduate students in data collection and analysis, ensuring accuracy and adherence to research protocols.
- Provided training and support in research techniques, including the use of software and instruments, to enhance students' technical skills.
- Assisted in the preparation and presentation of research findings, mentoring students in effective communication and presentation strategies.

HONORS AND AWARDS

Szugda-Emani Memorial Environmental Scholarship Award **2024**

- Given to an outstanding senior in Geography who shows passion for the environment in their education and research

Robert Goddard Achievement Scholarship **2020-2024**

- The Clark University Robert Goddard Achievement Scholarship, given for exceptional academic merit upon admission, provides support throughout all four years of study

Gamma Theta Upsilon Member **Inducted 2022**

- Inducted into the Alpha Sigma chapter of the International Geographic Honor Society. Members of GTU have established excellence in their geography coursework and are committed to furthering the cultural and practical status of geography.

CONFERENCE PRESENTATIONS

Riley, B., Gannon, S., & Byrne, B. (2024).Using camera trap data to evaluate the impact of anthropogenic presence upon wildlife at River Ridge Ranch. Poster session presented at the Ecological Society of America, Long Beach, California.

Nix, L., Laris, P., Winslow S., Gannon, S. (2024) Mapping Invasive Thistle and Mustard using Multispectral Imagery: A Methodological Study. Poster session presented at the Geo-Resolution Conference, St. Louis, Missouri

UNIVERSITY SERVICE

Office of Study Abroad & Away Program Assistant July 2023 - January 2024

Clark University

- Advised students on study abroad processes and managed their applications.
- Supported administrative tasks, including data management and document processing.

Office of Advancement Services and Research Data Assistant **August 2020 - May 2022**

Clark University

- Organized and digitized paper archives, improving data accessibility.
- Managed and updated Excel databases for alumni donations and transactions.

Lead Editor, Copy Editing and Content **August 2021 - May 2022**

Clark University Scholarly Undergraduate Research Journal

- Edited research articles to enhance clarity and quality, ensuring high editorial standards.
- Directed and trained a team of copy editors, overseeing the editorial process and maintaining quality control.

TECHNICAL SKILLS

- Geospatial Analysis: Geographic Information Systems (GIS), Remote Sensing, ArcGIS Suite, QGIS, Google Earth Engine, GeoDa, Rangeland Analysis Platform (RAP), Conservation Drones and GPS Technology, Spatial Modeling
- Programming Languages: Python, R, Java, SQL
- Field and Sensor Technologies: Camera Trap Analysis and Deployment, Acoustic Analysis and Deployment

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PROFESSIONAL AFFILIATIONS AND MEMBERSHIPS

- **Member,** Gamma Theta Upsilon (2022-present)
- **Member,** Ecological Society of America (2024-present)
- **Member,** Association of American Geography (2022-present)