Section 4c. Background and Past Findings

Section 4c(1)

We have selected methods of deer eradication due to their proven use on other removal projects and the lack of evidence for the efficacy of alternatives such as translocations and contraceptives. DeNicola et al. (2015) conducted a similar eradication effort for deer and elk from 2011 to 2015 on Santa Rosa Island. They found the Sentinel deer method combined with strategic aerial and ground shooting allowed them to successfully dispatch deer throughout the interior of the island within the desired timeframe (DeNicola, 2015). The shooting methods employed reduced animal suffering and met the American Veterinary Medical Association's stringent guidelines for humane handling and euthanasia.

The alternative, translocation of a subset of an overabundant deer population to a new area, has been tried by wildlife managers for decades. Unfortunately, translocating can put deer under immense stress and mortalities are often as high as 50% of the relocated deer (Jones and Witham 1990, Beringer et al. 1996, 2002, Cromwell et al. 1999). Capture myopathy induced from the stress of relocation is one main cause of mortality along with vehicle collision, predation, and hunting (O'Bryan and McCullough 1985). After nearly a century on the island without threats from predation and vehicles, the mule deer population on Catalina Island are particularly susceptible to several threats they would encounter upon relocation, and an acceptable survival rate is unlikely.

Conversely, contraceptives to control deer populations without culling have been tried only a handful of times by wildlife managers and usually at a smaller scale than Catalina Island. Raiho et. al. (2015) found contraceptives were successful if managers could capture at least 90% of the females over several years with the cost per doe being approximately $750 (Raiho et al. 2015). When the San Francisco Society for the Prevention of Animal Cruelty (1985) tried to use contraceptives to control the deer population they noted a paradox: "When the population is low and sterilization might stabilize the population, sufficient deer cannot be captured. It is only when the population is very high and animals are starving that they can be efficiently captured. However, at such high levels, it is neither desirable nor possible to stabilize the population." (Botti 1985).

While many options for deer population control on Catalina have been considered; eradication through aerial and ground shooting with the Sentinel deer method are the most likely to meet the objectives laid out in this permit when considering humane treatment of wildlife, costs, and effort.

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Section 4c(2)

Deer Population and Hunting

Since the introduction of mule deer to Catalina Island in the early 20th century, the island has experienced a new paradigm for the ecology and composition of habitats with the presence of these browsing herbivores. To assist in the mitigation of their impacts, the Catalina Island Conservancy entered its lands into the Private Lands Wildlife Management Program (PLM) in 1998 with the California Department of Fish and Wildlife to effectively manage the introduced mule deer population with specific objectives to uphold conservation standards. The primary objective is to maintain a reasonable mule deer population size that allows for the recovery and resilience of Catalina's habitats that include the rare and endemic plant taxa of the island. However, since entering the PLM, it is apparent that meaningful restoration on the island cannot be achieved with the current methods of management. Our findings show that mule deer on Catalina Island have reached unsustainable levels resulting in the degradation of the island's biodiversity and ecological stability.

To understand how mule deer on Catalina influence the effectiveness of management strategies, in 2021 the Catalina Island Conservancy performed a review of the deer population counts compared to harvest rates. To estimate population size, spot-light road surveys were performed within Avalon (only 2021) and the rest of the island (termed "the Interior", 2012-2021). The result was an accurate up-to-date understanding of deer populations that showed mule deer densities on Catalina Island can be drastically (6-12 times) higher than California mainland populations (Table 1). The total population size on Catalina Island in late June 2021 was approximately 1,771 mule deer (95%CI: 1,528, 2,053), with an average density of 9.1 deer km^2 (95%CI: 7.9-10.6) in the interior and 65.7 deer km^2 (95%CI: 41.4-104.3) in Avalon. Based on these 2021 estimates, the deer density in the town of Avalon was 5.6-9.3 times (average 7.2) higher than that in the island interior. The long-term counts of the mule deer population demonstrate a boom-and-bust cycle where deer counts tend to increase the year after high rainfall and vegetation availability. With the substantial rainfall so far in 2023, we will likely observe an additional dramatic increase in the population followed by a steep decline when California has another dry year (Figure 1).

Since natural predators do not exist on Catalina Island, hunting is our greatest tool to effectively manage the mule deer populations. However, assessing harvest data in comparison to population estimates reveals that PLM hunting is not sufficient to control mule deer populations at sustainable levels. According to Simard et al. (2013), mortality from hunting needs to reach

between 30-50% of the population to have a measurable impact on population size. On Catalina, hunt mortality has only exceeded 15% of the estimated population number once during the last 10 years (Table 2). The high population density, coupled with the lower resistance to browsing in Catalina plants, contributes to the outsized negative impact of the deer on threatened and endangered plants. Precipitation data in comparison to population estimates suggest mule deer numbers on Catalina are not controlled by hunting but by rainfall and are therefore at maximum damage capacity (Figure 1). Based on these models, introduced mule deer numbers cannot be sufficiently reduced by hunting under existing regulations.

Table 1. Mule deer population density in California hunting zones compared to Catalina Island.

	Density (ind/km2)				
California Hunt Zone	2013	2014	2015	2016	2017
D-10	0.64	0.55	0.78	0.90	0.83
D-11	0.82	0.76	1.13	1.64	1.13
D-13	2.39	1.43	1.23	1.57	1.38
D-14	1.02	1.07	1.95	1.95	1.54
D-15	0.42	0.48	0.50	0.42	0.32
Catalina Island	13.5	6.3	7.6	12.2	NA

Table 2. Mule deer harvest and population estimates (2010-2021)

Year	Total Deer Harvest	Percent Tag Success	Pop Estimate	Hunt Mortality (% of Population)
2010	180	66%	NA	NA
2011	282	79%	NA	NA
2012	310	80%	2387	12.99%
2013	309	77%	2541	12.16%
2014	225	66%	1227	18.34%
2015	217	68%	1474	14.72%
2016	244	71%	2372	10.29%
2017	207	65%	NA	NA
2018	223	66%	2061	10.82%
2019	181	57%	1341	13.50%
2020	221	65%	NA	NA
2021	245	64%	1771	13.8%
AVERAGE	236	69%	1915	13.36%

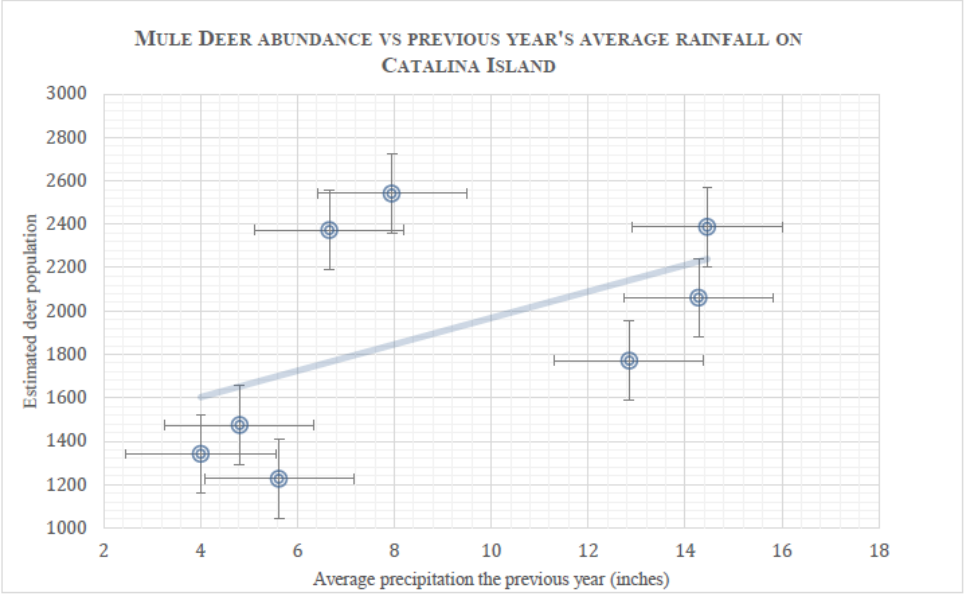

Figure 1. Correlation between deer population and rainfall on Catalina Island (generalized linear model with a negative binomial distribution, p=0.08).

Photo Monitoring Documents Landscape Level Changes

After many large herbivores were removed from Catalina Island by the early 2000s, the vegetation began to return to the landscape. To understand this revegetation process, the Conservancy reestablished a photo monitoring initiative in 2021. The initial photos used for comparison were a combination of landscape photos from various projects including the monitoring of oak die back by Denise Knapp in 2000, accuracy assessments of the Wild Boar Gully fencing, and historical photos provided by the Santa Catalina Island Company. In total, forty photo monitoring locations were selected across the island from these projects. Multiple photos from each location were selected and replicated to provide a qualitative snapshot of a limited set of variables affecting revegetation such as fire, fencing, aspect, and herbivores.

Our findings from this photo monitoring analysis showed significant shifts in the abundance and composition of vegetation on the island (Figures 2 – 5). While vegetation has increased due to the removal of goats, pigs, sheep, and cattle; the composition of species in the revegetation illustrates the selective influence of mule deer resulting in an overrepresentation of deer-resistant plants commonly found on the mainland. From this analysis, six plant species are shown to have increased in abundant cover: Coyote brush (*Baccharis pilularis)*, toyon (*Heteromeles arbutifolia*), black sage (*Salvia mellifera*), laurel sumac (*Malosma laurina*), lemonade berry (*Rhus integrifolia*) and California sagebrush (*Artemisia californica*). All these species are not unique to Catalina Island and are found in abundance in habitats on the mainland where deer naturally occur. One species, lemonade berry (*Rhus integrifolia*), was found to be the most significantly represented taxa in the revegetation of the island appearing in the greatest number of photos (Figure 2-3). Comparison of these historical photos showcases how over time the dramatic reduction in other ungulates lead to the recovery of specific deer-resistant vegetation.

Unfortunately, the photo analysis does show a lack of many rare and endemic species. These missing taxa include the Channel Islands tree poppy (*Dendromecon harfordii*), the Santa Catalina Island bush-mallow (*Malacothamnus fasciculatus var. catalinensis*), giant coreopsis (*Leptosyne gigantea*), and many other island endemics. All these island plants are found to be heavily browsed by deer on Catalina Island.

Figure 2. Location 10, Northwest facing slope with no recent fires. Lemonade berry (Rhus integrifolia) replacing oaks following die off.

Figure 3. Location 16, Expansion of toyon, lemonade berry, and laurel sumac. Note far hillside growth of shrubs and midground.

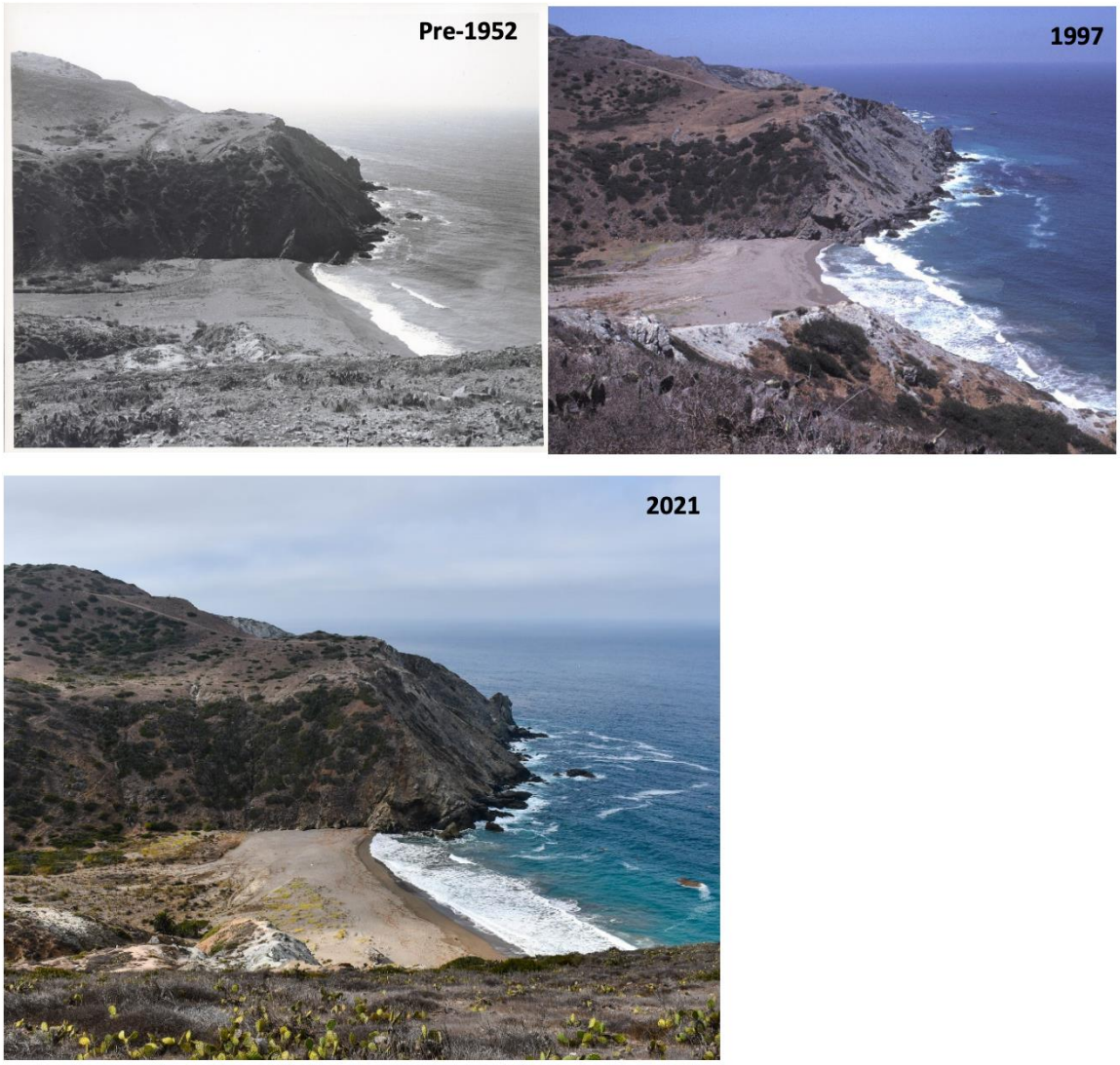

Figure 4. Ben Weston Beach. Shrub recovery on hillsides and sand dune habitat since cattle, pigs, and goat removal. Note the recovery of deer-resistant cover of California boxthorn (Lycium californicum) and coast prickly pear (Opuntia littoralis)

Figure 5. Stage road and east end. Revegetation since ungulate reduction showing a large portion of the invasive flax-leaved broom (Genista linifolia) and deer-resistant species. The grey patch in the center is the native island Ceanothus (Ceanothus arboreus) protected from deer with exclusive fencing.

Selective Browsing Leads to Cages and Exclosures

The selective browsing by deer is because native plants on Catalina Island have less defenses than closely related mainland taxa with respect to both chemical and mechanical traits (Bowen & Vuren, 1997). In a forage palatability trial comparing plants from ten matched taxonomic groups comprising samples from the mainland and Catalina Island, ungulates decisively favored the island plants (Salladay and Ramirez,2018). These findings illustrate how the mule deer perpetuate a devastating effect on endemic island flora and leads to an increase in plant species being listed as species of conservation concern. The flora of Catalina Island contains sixty-nine species or subspecies included in the California Rare Plant Ranking system. Of these, twenty-three meet the criteria for CRPR 1B.1 or 1B.2, the highest level of conservation concern. Three taxa — *Cercocarpus traskiae*, *Pentachaeta lyonii*, and *Sibara filifolia* — are federally listed endangered species; and one, Crocanthemum greenei, is federally threatened. The Catalina Island Conservancy has prioritized monitoring and recovery efforts for these four, as well as eight additional taxa. There are eight extant single-island endemic plant taxa on the island, of which four are regarded as conservation priorities. An additional twenty-nine Channel Islands endemic plants occur on Catalina Island illustrating how the island constitutes a locus of high diversity, endemism, and vulnerability within the California Floristic Province.

Currently, the only effective method the Catalina Island Conservancy has to prevent over browsing is to cage sensitive plants or construct exclosures with fencing. This strategy requires significant capital and is labor-intensive to build and maintain. The Conservancy relies on a network of 41 exclosures, ranging in size from 0.02 hectares to 45.44 hectares. In total, 89.94 hectares are protected in this way, representing 0.4% of the island's total land area. Of 2,516.34 hectares burned since 1999, 29.71 hectares have been enclosed. In areas where exclosures are constructed, rare and endemic island species such as the Island ceanothus (*Ceanothus megacarpus var. insularis*), feltleaf ceanothus (*Ceanothus arboreus*) are abundant and able to thrive but are found sparingly in areas without protection from deer (Figure 7). Although effective, these exclosures require extensive maintenance and routine monitoring that is exhaustive on resources and personnel, especially given the difficult island terrain. These fences regularly break allowing for mule deer to breach and browse on sensitive island shrubs and prevent recruitment (Figure 8).

Fencing off areas is especially critical for protecting rare and endangered species after wildfires (Figure 6). Mule deer drastically limit the recovery and survivorship of plants after fire. In a study of post-fire regeneration in three woody re-sprouters (*Heteromeles arbutifolia*, *Rhus integrifolia*, and R*hamnus pirifolia*) following the 2006 Empire Fire, Ramirez et al. (2012) found that exposure to mule deer resulted in an eight-fold increase in plant mortality. In plots protected by fencing, 11% of resprouts died; in deer-exposed plots, that figure was 88%. Deer browse also resulted in a >93% reduction in canopy coverage among dominant shrub species, opening the way for invasion by exotic species and vegetation type conversion (Figure 5). The impact of excess browsing in the wake of wildfire can be even more pronounced among obligately re-seeding taxa. After the Island Fire in 2007, Jacobsen et al. (2018) established a series of long-term monitoring stations at four sites within the fire footprint, each comprising 12-20 plots within a protective exclosure, and 12-20 unprotected plots immediately adjoining the exclosure. They monitored seedling survival, density, browse damage, and water relations in three re-seeding taxa: *Arctostaphylos catalinae*, *Ceanothus arboreus*, and *Ceanothus megacarpus*. All three species produce dense fields of new germinants in the wake of fire, which undergo thinning over subsequent years. In the case of *C. arboreus*, a clear effect on seedling height was observed within the first two years, with protected individuals reaching four times the size of those outside the exclosures. After fourteen years, this difference has translated into a major demographic effect: exclosed plots where *C. arboreus* occurred now host monotypic stands of that species (Figure 10), and the soil seed bank is being regenerated— ready for the next fire.

Exclosures prove to be an essential tool for protecting our state and federally listed species on Catalina but are restricted only to these locations where the presence of deer can be avoided. For instance, the Wild Boar Gully Exclosure on the southern portion of the island protects two federally endangered species, the Santa Cruz Island rockcress (*Sibara filifolia*) and the Catalina Island mountain mahogany (*Cercocarpus traskiae*) (Figure 11). The exclosure protects a significant portion of Wild Boar Gully and was constructed in 1999 to preserve the habitat and last remaining individuals of *C. traskiae* from introduced ungulates. There are only six individuals left of this species and it is considered the rarest tree in North America (Rieseberg et al. 1989). Smaller cages were initially constructed around the individual trees in the 1970s and 1980s, but evidence of browse on portions of the plants growing out of the exclosure and prevention of seedling recruitment led to the construction of the now existing exclosure (Martin 1984).

Unlike *C. traskiae*, the endangered *S. filifolia* is an annual herb that historically has been observed across the island, but currently only occurs both inside and outside of the exclosures around the Wild Boar Gully area. Alarmingly, *S. filifolia* is often not found at all outside the exclosure in certain years. Evidence of mule deer scat presence at these sites indicates potential damaging browse and trampling disturbance to the sensitive habitat in which they occur (Schneider et al. 2022). Today, most plants for this endangered species occur within the protective exclosure and recent range expansion has been observed.

Wild Boar Gully demonstrates the importance of deer removal with the observed protection and recovery of our rare and endangered plant species (Figure 11). However, without the significant investment of consistent monitoring and upkeep, this effective strategy of exclosure fencing is rendered useless against deer browsing. Despite the nine-foot-high durable metal fences, seedling browsing by deer has been observed following breaches in the Wild Boar Gully fences due to unforeseen events such as vandalism and storms (Landis 2008). Therefore, the removal of deer from the island is the best investment and option to prevent predation of seed and allow for recovery and restoration to persist.

Outside of protected exclosures, trees and other island native plants are outplanted on the landscape for restoration and educational purposes. These plants must be caged in wire mesh supported by metal posts (Figure 12). The purpose of these cages is similar to the exclosures to restrict their detrimental herbivory but for a particular individual plant. Without these cages, deer can browse plants and greatly diminish their growth and reproductive success. Mule deer appear to target the flowers of many rare and island endemic plants, including an exceptional pollinator supporting plant, the Saint Catherine's lace (Eriogonum giganteum var. giganteum (Figure 13). Denuding these flowers results in not only reduced seed banking and seed dispersal but causes negative ecological effects such as no longer supporting pollinators and native seed-eating birds. Many trees outside of protective cages or exclosures show severe browsing within the reachable parts of the plants (Figure 12 & 14). The effects of this intensive browsing are permanent deformation and defoliation leading to carbon deficits that significantly limit growth and reproduction. This is especially damaging for rare and endemic trees that rely on basal resprouting as a recruitment survival strategy, such as the Catalina Ironwood (Lyonothamnus floribundus ssp. floribundus) and the endangered Catalina Island mountain mahogany. Therefore, cages are essential for the restoration and protection of single individual plantings but do not allow for habitat and plant community protection.

Overall, our current management tools are inhibited by the presence of mule deer. The impacts of ungulates brought to Catalina have quickly decimated the sensitive island habitats across the island. Our findings show significant revegetation since the removal of pigs, sheep, cattle, and goats from the island, but the continued presence of mule deer prevents the successful recovery of rare and endemic plant communities. Science-based evidence has shown us how fire recovery of island plant species is greatly impeded by mule deer browsing leading to type conversion of habitat without proper exclusion of deer. Our long-term photo monitoring has also confirmed this type conversion and expansion of species that are not specific to Catalina, but the result of mule deer selectively encouraging the spread of deer-resistance taxa commonly found on the mainland. Time is a factor regarding native seed banks depletion. Every year of delay in controlling introduced deer browsing reduces the chance of island recovery and increases the scale and cost of the restoration effort. Therefore, we aim to remove the critical limiting factor of

mule deer to allow for strategic restoration and natural recovery to be successful on Catalina Island.

Figure 6. The Catalina Island Conservancy put up temporary barriers to protect rare and sensitive plants sprouting after the late-2021 fire. Grazing impact is already obvious. Photo taken on 01/21/2022.

Figure 7. Deer exclosures allow for the recovery and protection of island chaparral. These photos illustrate the restoration potential island wide after deer removal. Top: Inspiration Point exclosure, Bottom: Upper Toyon.

Figure 8. A downed fence following high wind conditions in 2023. This fence protects the recovery following the Middle fire in 2021. Many rare plants, including the federally threatened island rush rose (Crocanthemum greenei), are found within this exclosure are vulnerable to deer browse.

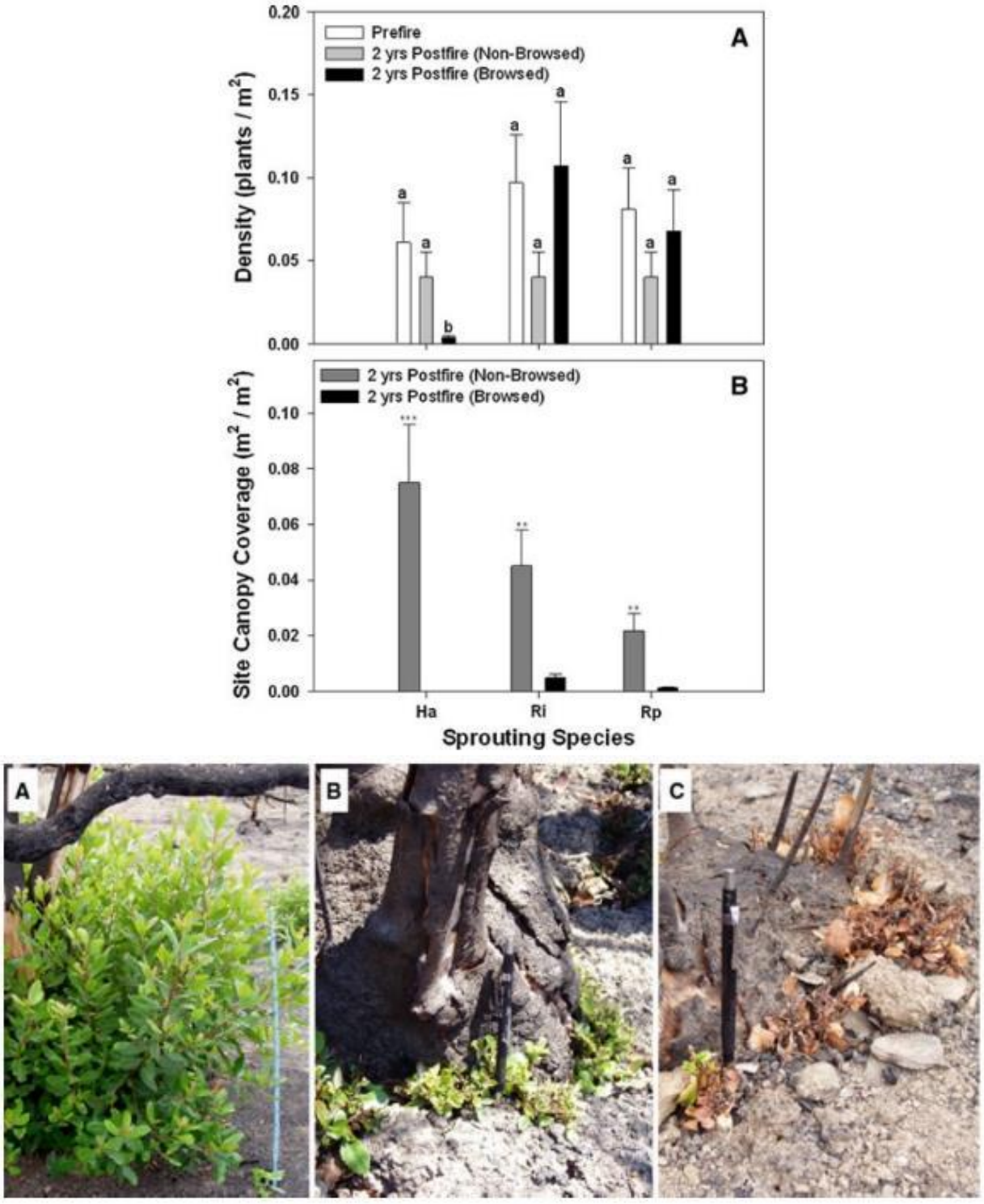

Figure 9. Above: a comparison of plant density (A) and site canopy coverage (B) two years after the Empire Fire in browsed and non- browsed plots. Below: Photos of resprouting H. arbutifolia one-year post-fire, showing a non-browsed resprout protected inside a deer exclosure (A); a deer-browsed resprout outside the exclosure (B); and a browsed resprout showing extensive dieback due to carbon starvation. Taken from Ramirez et al. (2012).

Figure 10. Left: a sea of Ceanothus seedlings emerged in the wake of the 2007 Island Fire. Right: by 2021, exclosure-protected C. arboreus at the Farnsworth/Hairpin site along Stage Road had formed a mature monotypic stand and were fruiting prolifically. Just outside the fence- line, the few remaining plants are sterile, and mere inches tall. Photos credits: R. Pratt (left) and S. Davis (right).

Figure 11. Wild Boar Gully Preserve. This exclosure protects a significant portion of habitat for the conservation of endangered plants taxa, Cercocarpus traskiae and Sibara filifolia.

Figure 12. Restoration cages surrounding individual plants outside of exclosures. Top: Chaparral species restoration at Haypress Reservoir. Note single individual protection, denuded landscape, and browse damage outside protective cages. Bottom: Outplantings of the endemic Catalina Island ironwood (Lyonothamnus floribundus ssp. floribundus). The bottom left shows the trees with protective cages and heavy browsing damage shortly after removal (bottom right).

Figure 13. Deer browse on the Catalina Island endemic, Eriogonum giganteum var. giganteum. Top and bottom left shows the plants in a pre-browse state with emerging inflorescences. Top and bottom right, the same plant is completely denuded of reproductive growth.

Figure 14. Shrubs and small trees outside of cages and exclosures exhibiting abnormal crown shape due to intensive browsing by deer. This effect has been termed "Catalina Topiaries" as they are a common and unfortunate occurrence on the island. Top: The endemic Catalina manzanita (Arctostaphylos catalinae); Bottom: Heteromeles arbutifolia.

Section 4c(3)

The conservation and restoration of Catalina Island's rare and unique flora is not possible with the presence of mule deer, especially on an impactful scale. Our current management actions include invasive species removal, outplantings, and exclosure fencing, which are not presently adequate to overcome the intense browsing pressure by this introduced ungulate to the island. With the removal of mule deer, both passive and active restoration is possible at a landscape level. The actions we will take under this scientific collections permit will allow us to strengthen the effectiveness of our conservation efforts and resources by focusing on research and restoration rather than labor-intensive exclosure building and maintenance. After removal,

we plan to re-establish the recovery and resiliency of Catalina's unique island flora by regaining adequate inputs to the seed bank through direct seeding or outplantings. To do this, we will capitalize on our existing native plant nursery and plan to develop a native seed farm to provide the essential supply of native plant materials for landscape-level restoration.

The Ackerman Native Plant Nursery currently produces and maintains plants for outplantings into exclosures or cages on the landscape (Figure 19). In addition, the nursery also acts as a repository for the germplasm of Catalina Island's native flora by maintaining a living collection of plants and seed storage as an ex-situ conservation strategy. These processes at the nursery allow for volunteer and educational opportunities for local and visiting members of the community. Currently, the seed conservation inventory holds over 3,246 accessions and represents 269 taxa, for a total of an estimated 240 million seeds. With the removal of deer, we plan to act on the opportunity for enhanced restoration capability allowing for more effective use of this valuable resource. A greater scale and diversity of plants will be produced for restoration projects across the landscape instead of being restricted to distinct exclosures. The nursery will also provide plug starts for the native seed farm to effectively grow and bulk seeds for restoration.

The removal of deer allows for a more integrated conservation strategy to include seeding activities for larger and more efficient restoration projects. Therefore, we plan to respond to the absence of deer with a native seed farm to produce and process bulk quantities of native seeds. This farm will provide access to a steady native seed supply chain to ensure the quality and biodiversity of habitats on the island can be established and maintained. A combination of wild-harvested and farm-cultivated seeds will be processed for use in the landscape. We will design and utilize specialty seed mixes based on the specific restoration site and determined goals. The opportunity for deer removal allows us to successfully germinate and reestablish natural native seed banks on the landscape that would otherwise have been actively decimated by mule deer.

Additionally, we are starting long-term monitoring in the spring of 2024 to document biotic and abiotic changes in the ecosystem. This will include wildlife and vegetation surveys, photo monitoring as well as other potential surveys for invertebrates and soil health. Since, there is substantial evidence in the literature supporting the negative impact of deer on songbird communities our wildlife surveys will focus on acoustic monitoring of birds as well as bats which, as primarily insectivores, are also likely to be impacted by deer (Gill and Fuller 2007, Martin et al. 2010, 2011, 2013, Holt et al. 2013). The plant transect surveys will focus on species diversity, recruitment and structure, and the photo monitoring will help us understand changes in erosion vegetation cover. These long-term surveys will be essential to understand ecosystem changes post deer removal and inform our landscape scale restoration project.

As described in previous sections, the current management of natural resources on Catalina Island is insufficient due to the browsing pressure of the introduced mule deer. The results of the activities covered by this permit will allow us to be untethered from the broken ecological system caused by the presence of these feral ungulates. Each of our restoration components of invasive species removal, site preparation, outplanting establishment, and seed bank management will be allowed to succeed following the removal of mule deer from the island. Our organization is funded and supported by a large and diverse community of people dedicated to the successful conservation of Catalina Island. The actions we propose to take under this permit will allow us the delivery a successful science-based restoration of the island with enhanced survivability of rare and charismatic plant communities for years to come.

Figure 1. Ackerman Native Plant Nursery located in Middle Ranch, Catalina Island.

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Section 4c(4)

The 2015 CDFW State Wildlife Action Plan (SWAP) “prescribes actions to conserve wildlife and vital habitat before they become rare and more costly to protect.” Appendix H-Offshore Islands of the 2015 SWAP discusses strategies to conserve the wildlife on California’s offshore islands, including Catalina Island, which is part Channel Islands archipelago. 110 Species of Greatest Conservation Need (SGCN), introduced in Appendix C of the SWAP, are present on these islands, with at least 40 present on Catalina Island. The Appendix also identifies Focal Species of Conservation Strategies Developed for Offshore Island in Table H-2, which includes all SGCN wildlife present on offshore islands and further features island manager identified important species. Wildlife identified as focal species include the two-striped gartersnake, Catalina California quail, Catalina Hutton’s vireo, island loggerhead shrike, and the Santa Catalina Island shrew. The proposed activities under the SCP would benefit wildlife identified in need of conservation in the 2015 SWAP.

Conservation Strategy 1 (Direct Management) of Appendix H states as an objective “Remove or reduced introduced mainland vertebrates and/or feral livestock that impact native species, specifically endemic species, and ecosystem function.” The Catalina Island population of mule deer are an introduced mainland vertebrate that are impactful to native/endemic species

and negatively impact ecosystem function. The management and removal of the mule deer population is consistent with the objectives of the SWAP and would benefit multiple taxa, including multiple Focal Species of Conservation Strategies including the Island Rush Rose *(Crocanthemum greenei*), the Catalina Mountain Mahogany *(Cercocarpus traskiae*), the Southern Island Bush mallow *(Lavatera assurgentiflora* ssp. g*labra*), and Catalina Nightshade *(Solanum wallacei*). The management of introduced mule deer under the scientific collection permit also facilitates the SWAP's objective to "restore disturbed sites…", which is the primary objective of the Conservancy's Island restoration project.

Catalina's flora includes 60+ species with California Rare Plant Ranking (CRPR) status, three species with federal endangered status (*Cercocarpus traskiae*, *Pentacheta lyonii* and *Sibara filifolia*), one with federally threatened status (*Crocanthemum greenei*), two with California endangered status (*C. traskiae* and *P. lyonii*), and one with California threatened status (*Dithyrea maritima*-last recorded in Los Angeles County in 1932). The continued presence of introduced mule deer is severely impactful to the health of Catalina's flora, both for individual species and at a landscape level. Without management of the introduced deer, seed farming will be limited in its efficacy and landscape-level habitat restoration will not be achievable. The management of deer, construction of a seed farm and supporting facilities, and implementation of a landscape level habit restoration plan are essential to securing the future of and enhancing populations of Catalina's native flora and fauna.