U.S. FISH AND WILDLIFE SERVICE
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2177 Salk Avenue, Suite 250
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CALIFORNIA DEPARTMENT OF
FISH AND WILDLIFE
South Coast Region
3883 Ruffin Road
San Diego, California 92123

In Reply Refer to:
FWS/CDFW-OR-2022-0016223

March 23, 2022
Sent Electronically

Deborah L. Rogers
Co-Executive Director and Director of Conservation Science and Stewardship
Center for Natural Lands Management
27258 Via Industria, Suite B
Temecula, California 92590-3751

Subject: Update to the Habitat Management and Monitoring Plan for Dana Point Headlands Biological Open Space, City of Dana Point, California

Dear Deborah Rogers:

This letter responds to the "Draft Update to the Habitat Management and Monitoring Plan [HMMP] for the Dana Point Headlands Biological Open Space" dated January 28, 2022, that has been prepared by the Center of Natural Lands Management (CNLM) to address a proposed change to public access policies for the Dana Point Preserve (also known as the Headlands Conservation Park; hereafter "Preserve") that is owned and managed by CNLM.

History of the Preserve and the HMMP

The original HMMP (URS and CNLM 2005) was prepared in association with the City of Dana Point's development approval for the Headlands Development and Conservation Plan (HDCP), which included amending the Dana Point Local Coastal Program to accommodate residential and visitor/recreational commercial land uses along with the establishment of 34 acres of Conservation Open Space and 34.5 acres of Recreation Open Space on the overall 121-acre Dana Point Headlands Property. Because the HDCP project proponent and former landowner of the Preserve is a "Participating Landowner" to the Orange County Central and Coastal Subregions Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP), the HDCP and associated HMMP were also prepared to conform to the requirements of the NCCP/HCP, which addresses impacts to and conservation of the federally endangered Pacific pocket mouse (*Perognathus longimembris pacificus*; PPM), federally threatened coastal California gnatcatcher (*Polioptila californica californica*), and other "Identified Species" throughout much of Central and Coastal Orange County, including the Dana Point Headlands property.

Among the provisions of the NCCP/HCP was a commitment by the landowners to grant the U.S. Fish and Wildlife Service (Service) and the California Department of Fish and Wildlife (Department)—jointly the Wildlife Agencies—an option to purchase a 22-acre portion of the Dana Point Headlands property designated as a "Temporary Pacific Pocket Mouse Preserve" should the Wildlife Agencies determine that "…continuance of the preserve is necessary to

ensure the survival and recovery of the species [PPM]" (NCCP/HCP Implementation Agreement Section 8.3.2 (a)(1)(F), pp. 85-86). Ultimately, the Wildlife Agencies waived our purchase option and supported approval of the HDCP based on the proposal to include as components of the HDCP the acquisition and permanent preservation of the Temporary Pacific Pocket Mouse Preserve by the Harry and Grace Steele Foundation and a commitment to manage this area in perpetuity for conservation purposes. These commitments were realized via the transfer of funds from the Harry and Grace Steele Foundation to CNLM to purchase and manage the Temporary Pocket Mouse Preserve and the establishment of a Conservation Easement (CE) to protect this property in perpetuity.

To help ensure that the CE is enforced, and its biological values and resources are maintained, the Wildlife Agencies are named as Third Party Beneficiaries to the CE, and CNLM has an obligation to periodically update the HMMP that helps govern uses within the CE "…consistent with best adaptive management practices and in consultation and coordination with [the Wildlife Agencies]" (Conservation Easement Section 5.1). Accordingly, you have requested that the Wildlife Agencies review and comment on the proposal to update the HMMP, which seeks to update the policies governing controlled public access to develop "…a public access schedule that more appropriately addresses a balance between public access and protection of sensitive (even endangered) natural resources" (HMMP Update, p. 24). Based on the status of PPM within the Preserve and the available information regarding the potential effects of outdoor recreation on wildlife, we support the proposed changes to the public access schedule, but we acknowledge that additional information regarding the effects of trail use on PPM in adjacent habitat would help inform future management of public access. Additional reasoning is provided below.

Status of PPM in the Preserve

Monitoring of PPM within the Preserve has documented dramatic fluctuations in the PPM population. Since the re-discovery of PPM in 1993, several comprehensive live-trapping efforts in the Preserve have detected fewer than 10 animals. There have also been two documented peaks in abundance. The first peak occurred in 2009 when 82 individuals were captured in May of that year (Brylski *et al*. 2010), following several years of habitat management and just prior to the Preserve being opened to public access. After 2009, the population began to decline, and by 2017 a comprehensive live-trapping effort detected just six individuals (Miller 2017).

Following the very low population numbers documented in 2017, we worked closely with CNLM to increase its capacity to manage habitat and increase the abundance of PPM within the Preserve. Through grant funding provided to CNLM by the Service, from December of 2019 through February of 2020, CNLM was able to create the more open habitat conditions preferred by PPM within 4.3 acres of the Preserve by removing dead shrubs, woody debris, leaf litter, and duff. Subsequent results from live-trapping surveys performed in June and July of 2020 were encouraging, with the capture of 77 mice suggesting the population rebounded and responded positively to the habitat management effort (Brehme *et al*. 2021).

However, as noted in the proposed modification to the HMMP, it is challenging to attribute the observed fluctuations in the PPM population to any single factor. Between 2009 and 2017, when

public visitation within the Preserve was increasing and the PPM population was in decline, there were also periods of drought and changes in the age structure and composition of the vegetation community. Following the 2019–2020 habitat management efforts and the observed increase of the PPM population, there was no public access allowed within the Preserve (see "Public Access in the Preserve" below). Regardless of the cause of the observed fluctuations in the PPM population, the monitoring results clearly illustrate that this population remains vulnerable to extirpation due to its isolation and small population size.

Additionally, even with the apparent rebound in numbers of mice within the Preserve, genetic studies suggest the Dana Point population has suffered a severe loss of genetic variation since its rediscovery (Swei *et al*. 2003; Wilder *et al*. 2020), likely associated with the population going through bottlenecks such as that observed in 2017. Loss of genetic variation increases the risk of extirpation of small populations because it results in the loss of adaptive potential (i.e., the ability of a species to evolve and adapt in response to changing conditions) and can lead to inbreeding depression (reduced fitness resulting from mating between close relatives; Franklin 1980). Thus, another focus of our efforts to recover PPM at Dana Point and elsewhere has been to formulate a genetic management strategy for the species.

Because the Dana Point population is genetically differentiated from the other two extant populations on Marine Corps Base Camp Pendleton (Swei *et al*. 2003; Wilder *et al*. 2020), and mice at Dana Point may have a different chromosome number than mice on Camp Pendleton (Shier and King 2020), significant questions remain whether it is appropriate to pursue genetic rescue (i.e., augment genetic variation within a population by outcrossing with individuals from another population) at Dana Point for fear of introducing outbreeding depression (decreased fitness of progeny from crosses between divergent populations). This underscores how critical it is to conserve the remaining genetic variation within the Dana Point population by maximizing the size of this population and preventing further bottlenecks while additional studies are performed to inform the genetic management strategy.

Public Access in the Preserve

When we provided our support for the HDCP, we did so with the understanding that the public would be granted controlled access to a trail constructed within the Preserve. Due to the small size and sensitivity of the PPM population, during development of the HDCP and HMMP we emphasized that it would be critical to design and regulate public use to safeguard PPM and other sensitive flora and fauna within the Preserve. Among the provisions incorporated in the HDCP and HMMP to address this concern were: fencing the perimeter of the Preserve, placing lockable gates at the trail heads, aligning and minimizing the width of the trail to minimize impacts to sensitive resources, fencing the trail alignment to discourage off-trail use, prohibiting the public from bringing dogs within the Preserve, and restricting public use of the trail to daytime hours. The HMMP further contemplated that the Habitat Manager (CNLM) would monitor public access and its consequences within the Preserve and would apply adaptive management to minimize impacts to individuals or populations of NCCP/HCP Identified Species from public access (URS and CNLM 2005).

To assist CNLM monitor public visitation to the Preserve, during 2010 we worked with the Natural Communities Coalition (the non-profit entity that helps oversee implementation of the NCCP/HCP) to fund the acquisition of trail counters to place at each of the trail heads. Public visitation data collected by CNLM since 2010 shows that the popularity of the Preserve has grown appreciably, with the estimated number of annual visitors nearly doubling between 2011 and 2017 to almost 250,000 visitors per year.

As discussed in the proposed modification to the HMMP, human disturbance of wildlife from non-consumptive recreation (e.g., hiking) can cause altered spatio-temporal habitat use, decreased survival and reproduction, reduced population abundance, and extirpation of animals from otherwise suitable habitat (see review by Dertien *et al*. 2021). Thus, it is important to consider modifying public access within the Preserve to ameliorate the threat that the increasing popularity of the Preserve to the public may present to the Dana Point PPM population. The status of this population further suggests a conservative management strategy is warranted that focuses on ameliorating all potential threats to this population, including recreation use, habitat senescence, Argentine ants, and other factors discussed in the HMMP update.

Adaptive Management of the Preserve

The Wildlife Agencies supported the HDCP based on the proposal to permanently preserve the Temporary Pacific Pocket Mouse Preserve and manage this area and its resources using adaptive management principles, which we determined would help promote the survival and recovery of PPM. Adaptive management makes use of management interventions and follow up monitoring to improve understanding of how a resource system works and improve subsequent decisions to help achieve management objectives. In developing the proposal to reduce public access to benefit sensitive resources within the Preserve, CNLM has considered the monitoring data on public use, the dynamics of the PPM population before and after restriction of public access to the Preserve due to COVID-19, and the growing body of scientific literature that indicates that even passive non-consumptive recreation can have deleterious effects on wildlife individuals and populations. Looking forward, we recommend that CNLM work with the Wildlife Agencies and others to determine how the existing monitoring program might be adjusted to better study the effects of trail use on PPM and other sensitive species. Refining the PPM monitoring methodology to use track tubes and live trapping to more frequently estimate PPM distribution and abundance on the Preserve, including documenting any changes in PPM distribution during days that the public is using the trail and days that they are not, should provide the information necessary to allow CNLM to continue to adjust public access and management effort in response to the changes in PPM populations and to adaptively manage the Preserve.

We recognize that providing the public access to nature is important for maintaining support for conservation efforts and that many members of the public will have an interest in the level of public access in the Preserve. Thus, our support for CNLM's proposed modification to the HMMP is based on the current status of the Dana Point PPM population and of the species as whole, which warrants a conservative management strategy within each of the extant populations. However, we wish to emphasize the importance of accompanying this management change with implementation of a more robust public outreach and education program that includes the use of

augmented signage and information displays. We also recommend implementing an updated species-specific monitoring plan to help address remaining questions about the effects of public access and other questions of concern to PPM management and recovery. The Wildlife Agencies are available to assist CNLM with an update to the species monitoring component of the HMMP.

Finally, we note that the plan includes guidance for establishing hours of operation (days of week/hours per day) for the public access trail but does not specify what those hours will be. We recommend including a figure that explicitly identifies the location of the trail where public access is permitted and a discussion of other allowable and prohibited public uses in the Preserve (e.g., access for pets or use of drones). To avoid confusion or different interpretations of allowable public use, we recommend these items be included as a component of the update to the HMMP.

We appreciate the opportunity to comment on the draft update to the HMMP and CNLM's management of the Preserve. We look forward to continuing to work cooperatively with CNLM to adaptively manage the Preserve and public access to continue to benefit PPM. Should you have questions or wish to discuss any of the above, please contact William Miller[1] with the Service at 760-431-9440, extension 206, or Emily Gray[2] of the Department.

Sincerely,

JONATHAN SNYDER Digitally signed by JONATHAN SNYDER Date: 2022.03.23 12:04:02 -07'00'

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Assistant Field Supervisor
U.S. Fish and Wildlife Service

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3/23/2022

David A. Mayer
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cc:
Jeff Rosaler, City of Dana Point
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July 28, 2022

Deborah L. Rogers, Ph.D.
Co-Executive Director and
Director of Conservation Science and Stewardship
Center for Natural Lands Management
Email: drogers@cnlm.org

Dear Ms. Rogers,

It has come to the attention of the City of Dana Point (the "City") that the Center for Natural Lands Management ("CNLM") website purports that the Habitat Mitigation and Monitoring Plan ("HMMP") applicable to the Dana Point Nature Preserve has been updated. This apparently is a position that CNLM has recently begun to assert before the Court in association with the ongoing litigation related to CNLM's unlawful restriction of public access upon the Nature Trail and Outlook Areas. The purported update to the HMMP makes substantial changes to the original HMMP, which have not been approved by the City or authorized by the issuance of a Coastal Development Permit ("CDP".) To be absolutely clear, the HMMP has not been lawfully updated, and the HMMP as originally approved remains the operative document.

By way of background, CNLM sent an email request to the City's Code Enforcement Manager asking for comments on a draft of a proposed update to the HMMP on January 28, 2022. The City's planning department never received a formal application to which it might be obligated to respond. Moreover, the City chose not to respond to your informal request for input, believing it would be more appropriate to do so, if at all, after the significant legal issues and litigation that have arisen between the parties are resolved. In this regard, the draft update does virtually nothing other than seek to restrict public access, which is the exclusive topic of the current litigation.

Should CNLM at some point seek the requisite approval for the draft update to the HMMP that was included in your January 28th correspondence, the City would not approve it for a variety of reasons including because the requested changes impede public access to the Nature Trails and Overlook Areas in a manner that conflicts with (1) the City's easement rights, (2) the entitlements that govern the use of the Dana Point Preserve (including but not limited to Coastal Development Permit 04-23 ("CDP 04-23"), the Headlands Development and Conservation Plan certified on January 14, 2005 ("HDCP") and the currently operative, original HMMP dated April 2005 (collectively, the "Entitlement Documents")), and (3) the Coastal Act. The Entitlement Documents were approved by the City and authorized by the California Coastal Commission ("Commission"), as well as the City's Municipal Code. (*See*, D.P.M.C §§ 9.27.030(a)(4) [imposing minimum requirement of permanent right of access for the public for active and/or passive recreational use for bluff top and trail access developments and further requiring City approval of Management Plan].) Indeed, as the California Coastal Commission clearly indicated in its November 4, 2021 letter to CNLM and the City, in order to lawfully establish daily hours of operation for the Nature Trails and Overlook Areas (and/or implement any management measures), CNLM must submit a CDP application to the City for its review and approval. Any action on the part of CNLM to limit public access absent a valid HMMP amendment (approved by the City) and a duly approved CDP is null and void, and in violation of the Coastal Act and the governing Entitlement Documents.

Notwithstanding the above, should you wish to update the HMMP as you have proposed, please submit an application to the City for that purpose, including an application for a CDP, and bear in mind the following comments:

General Comments on HMMP Update and Process

It is apparent from CNLM's conduct that led to the current litigation, and the language of the purported update to the HMMP, that CNLM is using the HMMP update as a pretext to avoid its obligations related to public access imposed by the Coastal Act. CDP No. 04-23 approved the development located at the Headlands, including but not limited to the Nature Trails and the Overlook Areas contained within the Dana Point Preserve. As a condition of that approval, General Condition No. 37 required that an HMMP be prepared and submitted to the City (amongst other agencies) for its "review and approval." (*See also*, D.P.M.C. § 9.27.030(H) [same].) The CDP also provided, as a condition of its approval, that all development must be consistent with the HDCP, and Local Coastal Plan Amendment No. 01-02. (Condition No. 3.) The HDCP, in turn, states that the Nature Trails shall be "accessible to the public year round" with the only exception being for "any specific period of time determined by the resources agencies to protect on site resources." (HDCP, p. 4-49.) Stated otherwise, the trails are to be open to the public *every day* (*i.e.*, "year-round") unless closure is required for a "specific period of time" (*i.e.*, one week) to protect on site resources. Clearly, this language was intended to allow for closure of the trails for limited periods of time for remedial activities, like replacing damaged ESHA, or for allowing additional protections during the gnatcatcher's mating season. It was ***not*** intended to (and indeed, does not) allow for CNLM to restrict public access to only three days a week in perpetuity. In fact, this type of limitation on public access – whether temporary (*i.e.*, during COVID) or more permanent – without an approved CDP is in direct violation of Condition No. 43 of CDP 04-23 which requires a CDP for any temporary event that has the "potential to significantly adversely impact public access, as determined by the Community Development Director."

In light of the provisions contained in the entitlements discussed above, it is no surprise that the original HMMP contemplated that the trails would incur a "substantial amount public use" and as such, it established *daily* hours of operation of 7am-sunset. (HMMP, p. 20). The exact language of the HMMP provides as follows: "Hours of operation for the Headlands Conservation Park and other areas of the Biological Open Space will be 7:00 a.m. to sunset." (*Ibid*.) Notably, to the extent portions of the HMMP identify these hours as "anticipated," it is only due to the fact that the hours must confirm with a CDP that is reviewed and approved by the City.

Because the City's approval was required for the HMMP, it goes without saying that the City must approve changes to the HMMP. In this regard, the purported "update" to the HMMP makes substantial changes to the original hours and days of operation, reducing the days the trails are open from seven days a week or "year-round" to a mere three days a week (Tuesday, Thursday, and Saturday). Moreover, it reduces the hours of operation from 7am-sunset (approx. 10-13 hours per day) to 8:00 am – 4:00 pm (8 hours per day). Stated otherwise, by the most conservative estimate, the purported HMMP "update" prepared by CNLM reduces the average number of hours the trails are open to the public from 70(+) hours a week (7:00 am-approx. 5:00 pm (winter) or 8:00 pm (summer); 7 days a week) to only 24 hours per week. This amounts to an approximate 66% reduction on public access. This is a substantial change to the original HMMP, and is not an "update;" but rather, constitutes a wholesale "amendment." As set forth in the Coastal Commission's November 4, 2021 letter, any proposed restrictions on public access (or any other management measure that CNLM desires to employ) constitutes "development" because it results in a change in the "intensity of use of land." (D.P.M.C. § 9.75.040; Condition 43 to CDP 04-23.) As such, regardless of whether these changes are labeled as an "update" or an "amendment" to the HMMP, CNLM must process an application for (and obtain approval of) a CDP. (D.P.M.C. § 9.69.020; *City of Dana Point v. California Coastal Commission* (2013) 217 Cal.App.4th 170) In sum, and regardless of semantics, the purported update requires City approval as was the case with the original HMMP, and further requires City approval of a CDP. Be advised the City will not support the drastic reduction of hours CNLM desires to impose as part of any CDP application.

<u>Specific Concerns Related to Each Section of the</u> <u>HMMP Update</u>

The HMMP was prepared for the City and CNLM by URS Corporation (Pat Mock) in April of 2005. The HMMP provides a comprehensive, cost-effective plan that establishes information, short and long-term management, and funding requirements necessary to ensure ecologically sustainable habitat conservation areas within the Headlands project boundaries. The HMMP was intended to be viable for an initial five-year period of habitat management and monitoring, with updates thereafter. The Reporting Requirements, therefore, instructs that the HMMP will be reviewed and updated once every five years and all requires that reports shall be submitted to the City of Dana Point and Wildlife Agencies. To date, this has not occurred. While annual working plans have been submitted to the City for review, a comprehensive HMMP update has not been received, nor has the City received a formal request to approve an update. Some explanation of these facts should be included.

Comments on Preface and Introduction Sections

The draft HMMP sent to the City for comment on January 28, 2022 only attempts to update the original HMMP as it relates to human access on the Nature Trail and Outlook Areas. The preface and executive summary attempt to lay the background for CNLM's efforts to limit public access on the Preserve by citing the regulatory documents. Yet, the introductory section is written in a manner to achieve the predetermined outcome of limiting public access, and cites only to provisions taken out of context to support this outcome, without addressing numerous other provisions of the operative Entitlement Documents. The Coastal Commission has already weighed in on the issue of whether the Entitlement Documents enable CNLM to set hours in a way that limits public access. In its letter dated November 4, 2021, to CNLM, Andrew Willis from the California Coastal Commission's enforcement staff states: "*the Master Coastal Development Permit for the Strand development (CDP No. 04-23) does not authorize hours of operation for the trail, not does any other coastal development permit. Therefore, a coastal development permit is required to authorize any hours of operation for the bluff top trail*." In light of this, the introduction and Preface sections will need substantial revision.

Comments on Public Use and Impacts Section

This section will need significant revisions to address the following observations. CNLM states that the Preserve's recent COVID-related closure provided "*new and undeniable evidence of the negative impacts on many aspects of natural systems and species from the presence of the public*." However, this evidence is not presented. There is one incident identified in the proposed update of a California Gnatcatcher breeding pair that had a failed nest, but there are numerous other instances of failed nest sites at the Preserve in the last 14 years that were not attributed to anthropogenic disturbances. The update is full of disclaimers that impacts on the Preserve's natural resources are "*difficult to ascertain, impacts are not directly observable, PPM detection is more challenging and less precise, the latter COULD include the influence of the visiting public, direct impacts to mammals are less known, CAN have a harmful effects of species…"* etc. These disclaimers make the conclusory statements related to impacts on nesting all the more unpersuasive.

The City recognizes that anthropogenic disturbances can have an effect on natural resources. yet, the proposed update does little to provide a correlation between disturbances on the Preserve and the effect on the physiology or populations of the endangered species onsite. The proposed update states that there is evidence of decreased PPM presence after the Preserve Trail initially opened, and an increase in onsite population after the trail was closed to the public in 2020. However, there is no evidence that this increase is directly related to an absence of human use, and not to other aspects of environmental change, such as habitat clearing done through management or reduced rainfall.

Furthermore, the HMMP recognizes that human use will be problematic and identifies the need for education and outreach. CNLM efforts for education and outreach to date have been minimal to non-existent. CNLM has too often relied on and relegated that portion of their mission to City staff, volunteers, and the Nature Interpretive Center (NIC).

The proposed update sites D'Antonio's (2020) introduction to the California Fish and Wildlife Journal Special Issue, Effects of Non-consumptive Recreation on Wildlife in California stating, *"if outdoor recreation is allowed in an area, impacts to the ecosystem are inevitable*." Yet, because it is written as a pretext with an outcome in mind, it does not include the following sentence of D'Antonio's introduction, which reveals: "*outdoor recreation has a myriad of benefits to society that range from economic growth, improved human health and well-being, community building, and increases in an individual's connection to nature. Moreover, outdoor recreation is one of the primary mechanisms by which humans interact with the natural world in a contemporary society.*" D'Antonio concludes that the key challenges facing researchers, conservation practitioners and biological area managers as they try to balance conservation goals with recreation access are understanding the mechanism and the level and extent of these impacts; identifying what level of negative impact, if any, is acceptable; and deciding how to mitigate or manage the impacts. These findings imply that adaptive management of natural systems is difficult and will require further information, research, education, and outreach. Simply shutting down an area for access cannot be the answer both from a true adaptive management standpoint, and from the perspective of the public's right for coastal access as defined by the Coastal Act.

Comments on the Public Access Plan Section

Section VI. Public Access Principals and Plan provides six guiding objectives to better balance the protection of sensitive natural resources and public access. The City agrees with all six objectives; however, it does not feel that the proposed update meets these objectives, or is otherwise consistent with the HDCP, the original HMMP, the City's easement rights or the Entitlement Documents as a whole. Moreover, these "objectives" do not, and cannot, eliminate the legal requirement for CNLM to apply for and obtain a CDP.

CNLM's four reasons for conducting the proposed update were as follows:

1. *Determine and establish hours of operation (days of week/hours per day) for the public trail.*

In response, please note: The City attempted to collaborate with CNLM staff to discuss reasonable hours of operations and an opening strategy after COVID. CNLM has simply stated that it is within their authority alone to set the hours of their property. They have not acted in good faith and have not consulted with City staff or other agencies regarding the continued trail closure, and in fact the continued closure ignores enforcement efforts by the City and the Coastal Commission. The City maintains that, per the HDCP, the trail should be open daily. Without an approved CDP from the City, the HMMP states that the trails should be open daily 7 am – Sunset. CNLM is currently and has been in violation of both the HDCP and HMMP.

2. *Revisit, revise and implement a more robust public awareness/education program.*

In response, please note: CNLM has done little to provide public awareness and education. CNLM has always relied heavily on the City (staff, volunteers and NIC) to provide outreach and education on their behalf. The City would welcome renewed efforts of CNLM to provide education and outreach, including having additional staff onsite during open trail hours.

3. *Conduct outreach to others who potentially use the Preserve for important activities.*

In response, please note: Additional outreach is warranted and should be encouraged.

4. *Conduct research and adaptively manage to serve the conservation values of the Preserve Trail.*

In response, please note: It is imperative that a balance between public access and conservation is used to manage the Biological Open Spaces on the Headlands. The implementation of adaptive management techniques (such as trail closures) cannot be made unilaterally. Adaptive management needs to be an open discussion that takes place between all stakeholders, and strategy implementation should be agreed upon utilizing the best available science and information. To that end, the City encourages continued efforts to monitor onsite resources to further understand and examine the relationship between human use and the natural resources.

Sincerely,

Brenda Wisneski

Brenda Wisneski
Community Development Director

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SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF ORANGE

CENTER FOR NATURAL LANDS MANAGEMENT, a non-profit organization, Plaintiff and Cross-Defendant, v. CITY OF DANA POINT; and DOES 1-50, Defendants.	Case No. 30-2021-01219668-CU-OR-CJC ASSIGNED FOR ALL PURPOSES TO: MICHAEL STRICKROTH, DEPARTMENT C15 **DECLARATION OF DEBORAH L. ROGERS, PH.D. IN OPPOSITION TO CITY OF DANA POINT'S MOTION FOR PRELIMINARY INJUNCTION**
CITY OF DANA POINT, Cross-Complainant, v. CENTER FOR NATURAL LANDS MANAGEMENT, Cross-Defendant.	<u>Reservation No.: 73774314</u> Date: August 15, 2022 Time: 1:45p Judge: Hon. Michael J. Strickroth Dept.: C15 Action Filed: September 7, 2021 Trial Date: None Set

DECLARATION OF DEBORAH L. ROGERS, PH.D.

I, Deborah L. Rogers, declare as follows:

1. I am a party in the above-entitled action. I have personal knowledge of the facts set forth herein, except as to those stated on information and belief and, as to those, I am informed and believe them to be true. If called as a witness, I could and would competently testify to the matters stated herein.

2. I am Co-Executive Director and Director of Conservation Science and Stewardship at the Center for Natural Lands Management ("CNLM" or "Center"), a non-profit organization operating for the protection and management of natural resources.

3. I have a 30-year career in natural resources conservation, working in the private, government (land management), academic, and non-profit sectors. I hold a M.S. from the College of Forest Resources at the University of Washington, Seattle, and a Ph.D. from the Department of Environmental Science, Policy, and Management at the University of California, Berkeley. My research has generally focused on the genetic diversity of native plant species and better understanding how to conserve that diversity to support adaptation and species longevity. I am an associate editor of the Native Plants Journal and an associate with the Department of Animal Science, University of California, Davis. I have also authored more than 50 peer-reviewed scientific publications, book chapters, and research reports and have been an invited speaker to many state, national, and international conservation conferences. Attached as **Exhibit A** is a true and correct copy of my Curriculum vitae.

4. The Center owns and manages the 29.4-acre Dana Point Preserve ("Preserve"), which was created to protect unique conservation values and natural resources, including the critically endangered Pacific Pocket Mouse and its fragile coastal habitat. I joined the Center in 2006 and have been involved in the management and oversight of the Preserve since that time.

5. The Preserve is located on top of a bluff, with no public trail to the beach or water. Public access to the Preserve is limited to a narrow (3 to 4 feet wide), fully fenced 0.5-mile trail ("bluff-top trail") with a few overlooks and two locking gates, one at each end of the trail. The City of Dana Point ("City") did not fund the acquisition of the Preserve or the endowment for its

stewardship, and does not pay money to the Center for managing the Preserve or the bluff-top trail.

6. When the bluff-top trail was opened in 2010, the Center generally allowed public access, through the locked gates on the fenced trail, from 7:00 a.m. to sunset, seven days a week. The Center would occasionally close all or parts of the bluff-top trail as needed for public safety, trail maintenance, and conservation reasons. For example, the Center has on occasion closed the bluff-top trail, or sections of the trail, for a number of days because a Coastal California Gnatcatcher, a threatened species, had built a nest close to the trail.

7. In March 2020, with the COVID-19 pandemic, state and local governments mandated the closure of spaces where people could congregate. In compliance with these orders, the Center closed the bluff-top trail.

8. After some of the COVID-19 restrictions initially lifted in May 2020, the Center looked at its options for re-opening the bluff-top trail, but still faced many operational challenges in terms of complying with the state and local mandates for safe re-opening. On or about May 26, 2020, I sent a letter to Mike Killebrew, City Manager, explaining how trail conditions, context, and purpose of the Preserve would not allow for immediate re-opening of the trail, given the requirements of Orange County, State, and other health authority orders and guidance for protection from COVID-19. Specifically, I explained that the narrowness of the trail did not allow for social distancing (which was still required by public health directives at that time), that there were contact surfaces that posed a danger (gates, post-and-cable fencing, informative panels), and that we needed to provide staff onsite as much as possible to monitor visitors (and wanted to provide safe conditions for the Center's staff as well). These conditions distinguished the bluff-top trail from those trails in the City's public parks. Attached as **Exhibit B** is a true and correct copy of this letter.

9. On June 19, 2020, the City responded to my letter, insisting that CNLM should open the trails on the Preserve since the City had "safely" opened trails at its own public parks. Attached as **Exhibit C** is a true and correct copy of this letter. Given there was no information in the letter that changed the public safety or natural resource protection considerations for the

Preserve, the Center continued to keep the bluff-top trail closed while it worked on a plan to safely open and operate it.

10. Over the next few months, the Center continued to monitor the County and State's COVID-19 statistics and work on a plan towards opening the trail that would allow some public access with reasonable safety measures for the public and its staff and volunteers. During this time (May through August 2020), the City's Nature Interpretive Center adjacent to the Preserve had erratic hours because most of the City's docents had not yet returned to volunteer service due to their concerns about COVID-19. Orange County was still in the 'red tier' in September 2020. After assessing the condition of the Preserve and the need to control public access, the Center notified the City in early October 2020 of its plans to open the Preserve with limited hours and under special conditions. Those special conditions included safety signage, sanitizing supplies at entrances, and a unidirectional flow for visitors (as social distancing could not be maintained if there was two-way pedestrian traffic). The Center then re-opened the bluff-top trail under these special conditions in mid-October 2020 for two days a week, initially from 9:00 a.m. to 12:00 p.m.; this was later extended to 8:00 a.m. to noon in recognition of visitors who valued earlier access. The Center's staff used these initial limited hours to, in part, observe compliance by the public with the special conditions.

11. About two weeks after the trail was re-opened, Jeff Rosaler, the City's Community Development Manager, emailed me on October 28, 2020, at 4:25 p.m., stating "the City will be exercising our rights under the Conservation Easement to open the trail for passive recreation daily" beginning at sunrise the next day. I responded that same day, expressing concern about the City's intent to provide uncontrolled access and reiterating that the bluff-top trail was currently open two days a week with plans to expand public access as appropriate. A true and correct copy of this email exchange is attached as **Exhibit D.** In the early hours of October 29, 2020, the City opened the Preserve's gates without the Center's permission, using a key provided to the City for emergency purposes. The City also chained open the gates with locks, leaving the gates in the open position and allowing for uncontrolled public access with no safety conditions. The City repeated this on October 30, 2020. Also, on October 29, the City ejected the Center (without any

prior notice) from the City's Nature Interpretive Center, moving CNLM property (office and field equipment) outside in unprotected conditions or into the trash. The Center had to act very quickly to retrieve equipment/property and find a storage space. On October 31, 2020, Center staff also observed that the power to the Scenic Gate entrance to the Preserve had been cut and there had been tampering with the gate timer. The Center had to expend time and resources to fix the gates and arrange for an alternative power source, and resume its proper management of the access to the bluff-top trail.

12. Despite these actions by the City, the Center continued to communicate responsibly and professionally with the City through phone calls, emails, and letters, as appropriate, to explain public safety, staff safety, and natural resource concerns and to provide updates on the trail access. On February 26, 2021, I sent another letter to the City, this time addressed to Councilmember Michael Villar, to respond to various questions about the status of access to the bluff-top trail. In this letter, I again explained the operational challenges with managing access to the bluff-top trail in compliance with mandated safety protocols. I also explained how the Preserve was the only place within City limits focused on the conservation of endangered species, and that the Center is making best efforts to provide public access while protecting species and rare habitat. Attached as **<u>Exhibit E</u>** is a true and correct copy of this letter.

13. In June 2021, the Center expanded hours of operation to three days a week (Tuesday, Thursday and Saturday) from 8:00 a.m. to 4:00 p.m. These days and hours of operation continue to this day. This decision regarding trail hours for the public was reached with careful consideration by the Center's staff of multiple types of information and input, including, but not limited to, the following considerations:

a. The Center conducted a survey of the visiting public over several weeks in April and May 2021, and the current trail hours reflect preferences in hours (days, times of day) expressed by the visiting public. Attached as **Exhibit F** is a true and correct copy of the 2021 trail visitor survey form.

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b. When the COVID-19 pandemic occurred, the Center's staff used the opportunity to revisit best management practices for the Preserve, including public access on the bluff-top trail, to protect the Pacific Pocket Mouse and other protected species and habitat.

c. The Center conducted a broad and unbiased search of the scientific literature regarding impacts of public visitation on wildlife in their native habitats. There was increasing scientific information regarding the positive response of wildlife to limitations on public visitation that were COVID related. This information included a special issue of a scientific journal published by the California Department of Fish and Wildlife. Of the scores of papers reviewed, a few indicated some positive effect from public visitation, mostly in the form of financial support that was not provided when the public was absent (which was not relevant to the Preserve or bluff-top trail, which did not receive any funding from public access).

d. The Center's staff reviewed years of "trail use" data, and revisited the status of species on the Preserve, including the Pacific Pocket Mouse, in preparation for revising and updating the public access section to the Habitat Management and Monitoring Plan ("HMMP"), which the Center is charged with updating. This further informed the Center's decision on the hours of operation for the bluff-top trail.

14. On June 25, 2021, the Center received an administrative citation from the City claiming the Center's management of the hours of operation for the required locked gates on the bluff-top trail was a public nuisance. The City indicated they were fining the Center for every day that the bluff-top trail was closed, raising the fines to $500 per day. The Center timely appealed these fines through administrative hearings with the City, but they were upheld by the City's administrative officer in separate decisions.

15. Despite being faced with thousands of dollars in fines, the Center has determined that the current hours of operation (three days a week from 8:00 a.m. to 4:00 p.m.) are an appropriate compromise between the competing public interests of species protection and public access to the Preserve trail. In addition to taking into account preferences expressed by the public from the Center's 2021 survey, the current hours of operation provide large continuous blocks of

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time on single days to avoid frustration of visitors and establishes a regular schedule for public access (rather than frequent schedule changes) to minimize confusion.

16. Furthermore, the Preserve is an extremely important public resource for the protection of natural resources, not just coastal views. It is the one of only two locations (the other is Marine Corps Base Camp Pendleton[1]) where the Pacific Pocket Mouse persists in the wild. Another resident species of the Preserve, the Coastal California Gnatcatcher, has lost so much of its habitat to development that it is listed as threatened. These species and other rare and sensitive species resident to the Preserve require protection to persist, and their protection is mandated under the federal Endangered Species Act. In contrast, there are many opportunities for coastal access (including direct coastal access to water), coastal views, and outdoor recreation throughout California and in the City of Dana Point. On the City of Dana Point's website there is a list of over 30 parks, trails, and beaches, offering many alternatives for exercise and views in the City of Dana Point, Orange County, and California.

17. The Center's current hours of operation for the bluff-top trail are in compliance with its rights and obligations under the Conservation Easement and other entitlements. As noted above, an abundance of scientific studies, including much recent evidence that resulted from COVID-related park closures, have made abundantly clear that public access—including walking on trails in close proximity to sensitive habitats and endangered species—can cause harm, especially in a small area like the Preserve. This is reflected in the updated HMMP, which was finalized in April 2022. The final 2022 HMMP includes scientific literature demonstrating the negative effects of the vibrations, sights, sounds, smells, and movements of public on many species; includes a review of public trail use data that showed dramatic increases in the numbers of trail visitors over a seven-year period; and recognizes the increased vulnerability of the Pacific Pocket Mouse to extinction given the relatively recent loss of one of the wild populations. Based

[1] Indeed, the Center recently entered into an agreement with the U.S. Department of Defense to provide enhanced protections for the Pacific Pocket Mouse on the Preserve to provide "regulatory relief" for its training missions on Marine Corps Base Camp Pendleton—the site of the only other two Pocket Mouse populations.

on this scientific literature and public trail use data, the Center determined that modifying the hours of operation was a necessary adaptive action towards better protecting the Preserve's natural resources from impactful and increasing public visitation. This was done with the support of the U.S. Fish and Wildlife Service and the California Department of Fish and Wildlife (collectively, the "wildlife agencies"), who noted that "based on the status of PPM within the Preserve and the available information regarding the potential effects of outdoor recreation on wildlife, we support the proposed changes to the public access schedule".[2] The Center provided a draft of the updated HMMP to the City for review with a cover letter dated January 28, 2022, requesting any comments by February 17, 2022. Attached as **Exhibit G** is a true and correct copy of this cover letter. The City did not respond before the 2022 HMMP was finalized in April 2022, after receipt of comments from the wildlife agencies.[3]

18. The bluff-top trail hours are well advertised to visitors and well-known in the local community. The Center's data show a moderating effect on the number of visitors per day, but there are still large numbers of visitors per day and the local visiting public are adjusting their routine visits to the current/ongoing trail hours. Data collected between August 2021 and February 2022 indicate that, on average, there are more than 500 visitors per day. This is higher than the average daily visitation across 2011-2017 (444 per day). Extrapolating to annual visitation, based on three days per week, the estimate is 78,593 visitors. In other words, the current public access schedule appears to be having the effect of minimizing public impact on the Preserve while still providing considerable public access.

19. On or about November 4, 2021, the Center received a letter from Andrew Willis, a staff person at the California Coastal Commission ("CCC"). A true and correct copy of this letter is attached to Mr. Rosaler's declaration as Exhibit 2. CCC staff had contacted me intermittently over 2020-2021 to inquire about trail status. It is the Center's understanding that this was in

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[2] True and correct copies of the 2022 HMMP and the joint letters of support from the wildlife agencies are included with the Center's Request for Judicial Notice ("RJN") ISO Demurrer as Exhibits 3 and 4, respectively.

[3] The City sent a letter to the Center on July 28, 2022 , responding to the Center's January 28, 2022, letter providing the draft HMMP for review.

response to the City's complaints about the Center's management of hours for the bluff-top trail. At no point in the Center's interactions with CCC staff did they request that the Center open the bluff-top trail seven days a week, from 7:00 am to sunset, as urged by the City. Rather, the Center's interaction with CCC staff has involved discussions of how the Coastal Act was meant to balance public access to coastal resources with the protection of natural resources, and encouragement for the Center and the City to work together to resolve this matter. The Center attempted to do this by, among other things, providing the City with a draft of the updated HMMP in January 2022 and encouraging settlement talks, but it is my understanding, on information and belief, that the City has refused to discuss any resolution that did not involve opening the bluff-top trail seven days a week, from 7:00 am to sunset.

20. If the Court would issue the requested injunction, it would prevent the Center from protecting the Preserve against overuse and public interference with critically endangered species and habitat. It is impossible to put a monetary amount on the potential loss of these unique natural resources, particularly the potential impacts to the Pacific Pocket Mouse; given that no other population exists except at Camp Pendleton, it is not possible to acquire other property for its protection. Indeed, any public visitation is most likely harmful and would not be reasonably recommended in the context of these sensitive resources. The Center is doing its best to manage responsibly for both public interests of access for exercise and visual enjoyment and for protection of endangered species. At the very least, the requested injunction would increase the management and rehabilitation costs for the Center's management of the Preserve. Currently, the Center spends more than $130,000 annually on Preserve management; this amount would need to be increased significantly if the hours of operation are expanded and there would be greater potential for resource degradation. Based on the information provided above, a bond in the amount of at least $1.3 million would be reasonable to offset the short-term and long-term effects of preventing the Center from carrying out its operations and duties to protect the Preserve against overuse, including the need to provide even more enhanced protections for Pacific Pocket Mouse. However, it is the Center's belief that this money would be better spent on maintaining and

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upgrading City amenities rather than forcing greater public access on the bluff-top trail and risking extinction of protected species.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on this 2nd day of August, 2022, at Hercules, California.

DL Rogers

Deborah L. Rogers

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EXHIBIT A

CURRICULUM VITAE – DEBORAH L. ROGERS

Center for Natural Lands Management (and University of California, Davis)

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Phone (510) 799-7701   Email: drogers@cnlm.org (debrogers@ucdavis.edu)

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PROFESSIONAL PREPARATION

Queen's University Kingston, Ontario, Canada	Biology (Honors)	B.Sc.
University of Washington Seattle, WA	Natural Resources (Forest Genetics)	M.S.
University of California Berkeley, CA	Wildland Resource Science (emphasis in Population Genetics)	Ph.D. 1994

PROFESSIONAL APPOINTMENTS (1987 – Present)

Co-Executive Director, Center for Natural Lands Management, June 2020 – present.

Director of Conservation Science and Stewardship, Center for Natural Lands Management, 2006 – present.

Research Associate, Department of Animal Science, University of California, Davis, CA, 2019 2019 – present.

Research Associate, Department of Plant Sciences, University of California Davis, CA, 2008 – 2019

Assistant Research Geneticist, (*Population/conservation genetics*). Genetic Resources Conservation Program, University of California, Davis, CA, 2001 - 2006,

Postgraduate Researcher, Genetic Resources Conservation Program, University of California-Davis, March 1997 – January 2001.

Postgraduate Researcher, University of California - Berkeley and Davis, December 1994 – December 1997.

Program Forester, Northern Forest Technology Development Unit, Ontario Ministry of Natural Resources, Timmins, Ontario, Canada, 1987 – 1990.

PUBLICATIONS (Refereed publications only)

DeWoody, J., **D.L. Rogers**, V.D. Hipkins, and B.A. Endress. 2018. Spatially explicit and multisourced genetic information is critical for conservation of an endangered plant species, San Diego thornmint (*Acanthomintha ilicifolia*). Conservation Genetics 19(4): 893-907.

Dunwiddie, P.W. and **D.L. Rogers**. 2017. Rare species and aliens: Reconsidering non-native plants in the management of natural areas. Restoration Ecology 25: S164-S169.

Rogers, D.L. and P.E. McGuire. 2015. Genetic erosion: Context is key. P. 1-24 in M.R. Ahuja and S.M. Jain (eds). Genetic diversity and erosion in plants. Indicators and prevention. Vol. 1. Springer International Publishing AG. Switzerland.

Meek, M.H., C. Wells, K.M. Tomalty, J. Ashander, E.M. Cole, D.A. Gille, B.J. Putman, J.P. Rose, M.S. Savoca, L. Yamane, J.M. Hull, **D.L. Rogers**, E.B. Rosenblum, J.F. Shogren, R.R.

Swaisgood, and B. May. 2015. Fear of failure in conservation: the problem and potential solutions to aid conservation of extremely small populations. Biol. Cons. 184: 209-217.

Hasselquist, E.M., N.J. Hasselquist, and **D.L. Rogers**. 2013. Management of non-native annual plants to support recovery of an endangered perennial forb, *Ambrosia pumila*. Restoration Ecology 21: 224-231.

Vargas-Hernández, J.J., **D.L. Rogers**, and V. Hipkins. 2013. Restoration of threatened *Pinus radiata* on Mexico's Guadalupe Island. *In*: Bozzano M., Jalonen R., Thomas E., Boshier D., Gallo L., Cavers S., Bordacs S., Smith P., and Loo J. (eds). Genetic considerations in ecosystem restoration using native tree species. A thematic study for the State of the World's Forest Genetic Resources. United Nations Food and Agriculture Organization, Rome, Italy.

Lorenz, W.W. D.B. Neale, K.D. Jermstad, G.T. Howe, **D.L. Rogers**, J.M. Bordeaux, S. Ayyampalayam, and J.F.D. Dean. 2012. Conifer DBMagic: A database housing multiple *de novo* transcriptome assemblies for twelve diverse conifer species. Tree Genetics and Genomes 8(6): 1477-1485.

Hoeksema, J.D., J. Vargas Hernandez, **D.L. Rogers**, Alfonso Aguirre, and J.N. Thompson. 2012. Geographic divergence in a species-rich symbiosis: Interactions between Monterey pines and ectomycorrhizal fungi. Ecology 93: 2274-2285.

Rogers, D.L. 2010. Genetic diversity in oaks: Managing the genetic interface between natural and urban landscapes. Pp 47-53 *in* 'Oaks in the Urban Landscape: selection, care, and preservation'. Costello, L.R., B.W. Hagen, and K.S. Jones. University of California Pub #3518.

Rogers, D.L., C.O. Qualset, P.E. McGuire, and O.A. Ryder. 2009. The silent biodiversity crisis: Loss of genetic resource collections. Pp 141-159 *in* 'Conservation Genetics in the Age of Genomics'. Amato, G., O. Ryder, H. Rosenbaum, and R. DeSalle, eds. Columbia University Press, New York.

Rogers, D.L, A.C. Matheson, J.J. Vargas Hernández, and J.J. Guerra Santos. 2006. Genetic conservation of insular populations of Monterey pine (*Pinus radiata* D. Don). Biodiver. Conservation 15:779–798.

Rogers, D.L, J.J. Vargas Hernández, A.C. Matheson, and J.J. Guerra Santos. 2005. Conserving the Pines of Guadalupe and Cedros Islands, México: An International Collaboration. Pp 31-54 *in* 'Environmental Issues in Latin America'. Aldemaro Romero and Sarah West, eds. Springer.

Rogers, D.L. 2004. Genetic erosion: No longer just an agricultural issue. N. Pl. J. 5 :112-122.

Rogers, D.L. 2004. *In situ* genetic conservation of a naturally restricted and commercially widespread species, *Pinus radiata*. Forest Ecology and Management.

Rogers, D.L. 2000. Genotypic diversity and clone size in populations of coast redwood (*Sequoia sempervirens* (D.Don) Endl.). Can. J. Bot. 78: 1408-1419.

Bruederle, L.P., **D.L. Rogers**, K.V. Krutovskii, and D. Politov. 2000. Population genetics and evolutionary implications. *In* Tomback, D.F., S.F. Arno, and R.E. Keane (eds.) Whitebark Pine Communities: Ecology and Restoration. Island Press, Washington, D.C. Pp 137–153.

Rogers, D.L. 1999. Allozyme polymorphisms discriminate among coast redwood (*Sequoia sempervirens*) siblings. Journal of Heredity. 90: 429–433.

Rogers, D.L., C.I. Millar, and R.D. Westfall. 1999. Fine-scale genetic structure of whitebark pine (*Pinus albicaulis*): Associations with watershed and growth form. Evolution 53: 74–90.

Rogers, D.L. 1997. Inheritance of allozymes from seed tissues of the hexaploid gymnosperm, *Sequoia sempervirens* (D.Don) Endl. (Coast redwood). Heredity 78(2): 166–175.

Rogers, D.L., D.E. Harry, and W.J. Libby. 1994. Genetic variation in incense-cedar (*Calocedrus decurrens*): I. Provenance differences in a twelve-year-old common-garden study. Western Journal of Applied Forestry 9(4): 113–117.

Rogers, D.L. and T.J.B. Boyle. 1991. Unequal paternal contributions in black spruce polycross seedlots. Heredity 67: 373–379.

Cheliak, W.M. and **D.L. Rogers**. 1990. Integrating biotechnology into tree improvement programs. Can. J. For. Res. 20(4): 452–463.

Rogers, D.L., R.F. Stettler, and P.E. Heilman. 1989. Genetic variation and productivity of *Populus trichocarpa* and its hybrids. III. Structure and pattern of variation in a 3-year field test. Can. J. For. Res. 19: 372–377.

Stettler, R.F., P.E. Heilman, J.M. Dunlap, and **D.L. Rogers**. 1987. Breeding of North American Poplars for short rotation intensive culture. International Botanical Congress Abstracts 17: 164.

Rogers, D.L., C.I. Millar, and R.D. Westfall. 1996. Genetic Diversity within Species. *In* The Sierra Nevada Ecosystem Project, A report prepared for Congress, Volume II, Chapter 28, pp 759–838.

LICENSES and PERMITS

Qualified Applicator's License, California Department of Pesticide Regulation (first obtained 2010) Landscape specialization ("B"), License # 123296

US Fish and Wildlife Service 10(a)(1)(A) permit – *Ambrosia pumila* and *Acanthomintha ilicifolia*

California Department of Fish and Wildlife Scientific, Educational, or Management Permit No. 2081(a)-17-008-RP. San Diego Thornmint (*Acanthomintha ilicifolia*). 2017-2022.

NOTABLE AWARDS

Fullbright Scholar (Canada/USA) 1993-94

SERVICE ON REVIEW COMMITTEES AND EDITORIAL BOARDS

- Associate Editor, Native Plants Journal, 2005-present.
- Review Panelist, Ornamentals 2018, USDA ARS Plant Genetic Resources, Genomics, and Genetic Improvement National Program. August – November, 2017.
- Review panel for research proposals to the University of California UC-MEXUS program, Riverside, CA, June 13, 2006.
- Research review meeting of the USDA Forest Service's Pacific Southwest Research Station and National Forest Genetic Laboratory with Forest Service Chief and staff, Placerville, CA, November 29, 2005.
- Scientific review panel for 'Preserving Wild California Program' of the Resources Legacy Fund Foundation, Sacramento, CA, November 21, 2005.
- Service on External Review Committee, Technical Advisory Visit, as requested by the Institute of Forest Genetics, USDA Forest Service, Placerville, CA. March 17-18, 2004.

- Reviewed ten funding proposals for merit under the 'Roots and Seeds' grant program, as requested by the National Tree Trust, February 17, 2004.

SELECTED RECENT SYNERGISTIC ACTIVITIES

Invited presentation: (*Genetic considerations for climate change*). Rogers, D.L. North Sound Riparian Conference. January 19, 2021. (virtual conference)

Invited presentation: (*When the crop is an endangered species: Managing risk and efficacy in the use of pesticides on endangered species preserves in the western U.S.)* Rogers, DL., Klementowski, M.M. and Brown, A.M. American Chemical Society Annual Meeting, August 16-20, 2020. San Francisco, CA (virtual conference).

Invited presentation (*The true cost of perpetual protection: Lessons from California*) Australian Land Conservation Conference, November 24, 2016, Melbourne, Australia.

Invited presentation **(***Non-Local Natives and Non-Native Locals: Potential Risks and Benefits in the Management of Rare Species*)**.** UC ANR Do No Harm Workshop 2016: Considerations for the Use of Non-local Species in Ecological Restoration. Elise Gornish and Travis Bean, Organizers. University of California at Davis, November 15, 2016.

Symposium organizer and speaker (*Conserving rare and imperiled species in the context of climate change: case studies from research, management, and policy perspectives*). Natural Areas Association annual national conference. Lisa Smith (NAA) and Hugh Safford (USDA FS and UCD) et al, organizers. October 18-20, 2016, University of California, Davis, CA.

Invited Speaker (*Science-based conservation of natural areas and listed species on CNLM preserves*). Natural Resource Management and Conservation in the Sierra Foothills, Jeremy Janes, Organizer, UC ANR. February 10, 2016 UC Sierra Foothill Research and Extension Center, Browns Valley, California.

Conference presentation (*Management of the cryptic threats of genetic erosion, inbreeding depression, and maladaptation*) Conservation Conference, California Native Plant Society, January 13-17, 2015, San Jose, CA.

Conference Presentation (*Small things matter: Guidance for protecting genetic diversity in restoration of rare plant species*). National Native Seed Conference, April 14-16, 2015, Santa Fe, New Mexico.

Invited Participant, Second annual California Islands Botanical Extravaganza on San Clemente Island, April 10-13, 2015, San Clemente Island, CA.

Invited Speaker (*Management of the cryptic threats of genetic erosion, inbreeding depression, and maladaptation*)The Science of Threats: Conservation Not by the Seat of our Pants Jim André (UC Riverside) and Shannon Still January 13-17, 2015. San Jose, California

Invited Speaker (*San Diego Thornmint Genetics: Information, application, and cautionary notes*). San Diego Thornmint Working Group, September 26, 2014, San Diego, CA.

Invited keynote (*Managing for the new normal: using novel ecosystems to achieve conservation and restoration objectives – a population genetic perspective*) California Invasive Plant Council Conference, October 2-5, 2013, Lake Arrowhead, CA.

Invited Speaker (*The Challenge of Managing Genetic Diversity in a Conservation Context*). California Native Plant Society – Milo Baker Chapter, April 16, 2013, Santa Rosa, CA

Invited Speaker (*Introduction to Cost Analysis for Perpetual Stewardship in the Context of Mitigation*). California Council of Land Trusts Mitigation Summit, Jan 24, 2013, Sacramento, CA.

Symposium organizer and speaker (*Conservation value of non-native plant species: The science of exceptions*). Society for Conservation Biology North American Congress, July 17, 2012, Oakland, CA.

Workshop Leader (*Effective Cost Analysis for Perpetual Stewardship*). California Department of Fish and Game, Regions 5 and 6, June 4-7 2012, Los Alamitos, CA.

Invited Speaker (*The enigmatic and iconic Monterey pine (Pinus radiata): its incomparable roles and challenges*). University of California Master Naturalist Program, May 23, 2012, Pacific Grove, CA.

Invited Speaker (*In situ stewardship of small populations: when extinction is not an option*). Symposium on Conservation of Extremely Small Populations. February 10-11, 2012. University of California, Davis, CA.

Workshop Leader (*Effective Cost Analysis for Perpetual Stewardship*). California Department of Fish and Game, Oct 4-5, 2011, Sacramento, CA.

Invited speaker (Jumping *Genes: Genetic considerations when planting oaks in urban landscapes*). Western Chapter of the International Society of Arboriculture, August 26, 2011; Stanford University, Palo Alto, CA.

Invited speaker (*Revisiting Restoration Genetics in the Context of Climate Change*). Society for Ecological Restoration; May 20-21, 2010; Mammoth Lakes, CA

Invited speaker (*The Certainty of Genetic Roles: the Uncertainty of Genetic Rules*) National Plant Conference May 17-20, 2010; Snowbird, UT.

CURRENT AND RECENT CONTRACTS AND GRANTS (selected sample):

“Evaluating Fire Effects on Vernal Pool Species and Landscapes in northern California.”, US Fish and Wildlife Service Cooperative Agreement, $25,000; 06/05/2019 – 12/31/2022. PI: D.L. Rogers.

“Genetic studies of *Chorizanthe parryi* var. *fernandina* (S. Watson) San Fernando Valley Spineflower”, Newhall Land and Farming Company, $230,385; 06/14 – 12/19. PI: D.L. Rogers.

“Stewardship Reserve Requirement Review”, Sonoma County Agricultural Preservation and Open Space District, $124,652; 04/14 – 12/18. PIs: D.L. Rogers, C.L. Little, and M. Labbé.

“Stabilizing and improving a state- and federal-endangered species, population of Palmate-bracted bird’s beak (*Chloropyron palmatum*)”. US Fish and Wildlife Service Cooperative Endangered Species Grant Program, $174,720 03/17 – 11/18 PI: D.L. Rogers

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EXHIBIT B

Center for Natural Lands Management

A non-profit organization for the protection and management of natural resources

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Fax: 760.731.7791
www.cnlm.org

May 26, 2020

Mr. Mike Killebrew
Manager
City of Dana Point
33282 Golden Lantern
Dana Point, CA 92629

Via email to: mkillebrew@danapoint.org

Re: Trail Closure Response to COVID-19 on CNLM's Dana Point Preserve (S033)

Dear Mr. Killebrew:

The Center for Natural Lands Management (CNLM) has recently been approached by City of Dana Point (City) staff and members of the public regarding the schedule for reopening the trail on CNLM's Dana Point Preserve. Together with the City, CNLM is committed to the safety of our staff, volunteers, and the visiting public. In the wake of careful and ongoing consideration, our responsibilities require, and our assessments have determined, that the CNLM Dana Point trail remain closed until further notice due to the COVID-19 pandemic. The re-opening of this trail must responsibly be based on the specific conditions of this trail, the status of COVID-19 cases in the County, and public health agency orders and guidelines. In brief, the size and configuration of the trail do not allow for visitors to practice the social distancing or CNLM to provide safe conditions required to prevent the spread of COVID-19 per state and county public health orders and guidelines. To assist with protecting the health and safety of our staff, volunteers, and the public, we request that the City postpone opening the parking lot and restrooms associated with the City's Nature Interpretive Center at Dana Point (NIC) until such time as the City determines it can safely open that facility to the public.

The trail on our Dana Point Preserve has conditions that prohibit CNLM from complying with the orders and strong recommendations of the County of Orange Health Officer (issued May 22, 2020). Trail and Preserve conditions do not allow us to comply with the County's order to follow the State's re-opening guidance for Stage 2 (as interpreted for related industries such as agriculture and outdoor museums as there do not appear be guidelines specific to nature preserves). The constrained size of the Preserve, the narrowness of the trail (3 ft – 4 ft), the post-and-cable trail boundaries that are needed to keep visitors from impacting sensitive habitat and endangered species, and the practical limits on staff resources present conditions that prohibit compliance and would put at-risk the visiting public and our staff and volunteers if the trail were to be re-opened at this time. Specifically, the required conditions for re-opening that range from impractical to impossible to implement include:

- Implement measures to ensure physical distancing of at least six feet between individuals.
- Establish a unidirectional trail and enforce the guidance to keep individuals six feet apart.
- Ability to frequently clean and disinfect commonly touched surfaces such as multiple gates, fence posts and fence cables (i.e., on this Preserve, we have 600 metal posts and over 20,000 feet of cable frequently touched by users).
- Require visitors to wear face coverings.
- Limit the number of visitors on the trail at one time to prevent congregations in the parking lot, bathrooms, NIC, at the trailhead, or on the trail.
- Implement a timed or advanced reservation system to stagger visitor use.

The public use of the Preserve is influenced by the status of the NIC, restrooms, and parking lot. As such, we respectfully request your assistance in protecting the health of staff, volunteers, and the public, as well as the safety of the resident endangered species (the Pacific pocket mouse and the California gnatcatcher) by keeping the parking lot and restrooms closed until the NIC can be reopened safely and fully staffed. Since the beginning of the COVID-19 response, we noted when the parking lot and restrooms were open, while the CNLM trail was closed, there was more trespass onto the Preserve than after the parking lot closure on March 23, 2020. During sunset hours and weekends, when we typically have the greatest number of visitors, it would be difficult, if not impossible, to prevent gatherings in the parking lot and around the Nature Interpretive Center, putting the public and our staff at risk. In addition, this is a particularly sensitive time of year (i.e., breeding season) for the two protected species onsite, the Pacific pocket mouse and California gnatcatcher. It is during this time that trespass is more likely to result in harassment or 'take' of these species which is in violation of the Endangered Species Act and, more importantly, would have a detrimental impact to the recovery of these vulnerable populations.

We understand the desire of the public to return to enjoying the pleasures of walking the trail on the Dana Point Preserve. We empathize with the challenges faced by you and your staff in making responsible decisions for your facilities at Dana Point and elsewhere in the City. CNLM greatly appreciates your assistance and continued support during this ever-fluid situation. We will continue to monitor the situation relative to COVID-19 data for Orange County and County and State orders and guidance on this topic. If you should have any questions, please contact Ms. Korie Merrill, Preserve Manager (kmerrill@cnlm.org or (949) 218-1145).

Sincerely,

Deborah Rogers, Ph.D.
Director of Conservation Science and Stewardship
Center for Natural Lands Management

cc (All Via Electronic Mail):

Mr. Robert Sedita
Director of General Services
rsedita@danapoint.org

Ms. Bernice Villanueva
Natural Resource Manager
bvillanueva@danapoint.org

Ms. Korie Merrill
Preserve Manager
kmerrill@cnlm.org

Ms. Kim Klementowski
Regional Preserve Manager
Kklementowski@cnlm.org

EXHIBIT C

June 19, 2020

Deborah Rogers, Ph.D
Director of Conservation Science and Stewardship
Center for Land Management
27258 Via Industria, Suite B
Temecula, CA 92590-3751

Re: Trail Closure Response to COVID-19 on CNLM's Dana Point Preserve (S033)

Dear Ms. Rogers:

Thank you for your letter dated May 26, 2020, outlining the Center for Natural Lands Management's (CNLM) desire for the Headlands Reserve trail (attached) to remain closed due to the Covid-19 pandemic. While the City of Dana Point (City) shares your concerns regarding the safety of the public, we strongly disagree with your assessment of the conditions required to safely open the trail.

In reviewing the Headlands Development and Conservation Plan it states the following:

> *The overall goal of the program is to provide for the short and long-term preservation of natural resources within the parks and open space areas while addressing appropriate public recreational use and enjoyment of the Headlands area on an ongoing basis (HDCP 4-113).*
>
> *The bluff-top trail in the Headlands Conservation Park shall be accessible to the public year-round, except for any specific period determined by the resource agencies to protect on-site resources. The recipient public agency or non-profit entity will determine hours of daily operations (HDCP 4-49).*

To our knowledge, the resource agencies have not approved or been made aware of this semi-permanent closure of the bluff top trail system. The City does not believe that the endangered habitat or species within are threatened by the trail being open or closed during this timeframe.

The City has taken measures to safely open the public trails at both Harbor Point and Hilltop Park. These safety precautions include measures that CNLM stated were impractical or impossible to implement including:

- Implement measures to ensure physical distancing of at least six feet between individuals.
- Establish a unidirectional trail and enforce the guidance to keep individuals six feet apart.
- Frequently clean and disinfect commonly touched surfaces.
- Require visitors to wear face coverings.

The City has found that the public has been open and receptive to the posted guidance and has been utilizing our trail system in a safe manner. City staff is looking forward to the time when staff and docents will be back educating and encouraging the public within the Nature Interpretive Center to enjoy all of the parks and amenities associated with the Dana Point Headlands. To that end, we will be opening the parking lot, restrooms and Nature Interpretive Center within days, not weeks.

As a reminder, the City of Dana Point, as the Grantee of the conservation easement, has the right to ensure public access to the bluff top trail. The City is looking to continue its partnership with the Center for Natural Lands Management and requests that the public trails be made available once again for the public to enjoy. As part of this partnership, City staff and docents will be available to direct and assist in ensuring the public is educated concerning the posted trail guidance. We would also be available to discuss mechanisms for ensuring the continued cleanliness, including disinfecting of the hard surfaces within the trail, by utilizing shared resources.

Please reach out to me directly to discuss our continued collaboration and we look forward to partnering with CNLM to get the trail open and in use shortly.

Sincerely,

Michael A. Killebrew

Michael A. Killebrew
City Manager
City of Dana Point

Attachement: CNLM Letter

Cc (Via Email):

City of Dana Point
Robert Sedita, General Services Manager
Bernice Villanueva, Natural Resources Protection Officer
Jeff Rosaler, Community Development Manager
Patrick Munoz, City Attorney

Center for Natural Land Management
Korie Merrill, Preserve Manager
Kim Klementowski, Regional Preserve Manager

Coastal Commission
Andrew Willis, Coastal Program Analyst

EXHIBIT D

On Wed, Oct 28, 2020 at 4:25 PM JEFF ROSALER <JROSALER@danapoint.org> wrote:
Deborah,
The Conservation Easement for the Headlands Conservation Park recorded on November 3, 2005 by the Center for Natural Lands Management in favor of the City of Dana Point states the following:
5.2 Permitted Uses
(d) Public Use and Access. Certain portion of the Conservation Park, which portions are more particularly described in the Restoration/Revegetation Plans, shall be open to the public for scenic enjoyment, education and passive recreation. Except as provided in Section 6 with respect to Marguerita Road, such public access shall be controlled and shall be limited to the nature trail and overlook areas to be constructed on the Conservation Park as depicted on Exhibit A (the Nature Trail and Overlook Areas) attached hereto. Permitted passive recreational uses include, but are not limited to, walking, hiking, jogging and bird watching. Notwithstanding the foregoing, this Conservation Easement does not convey to the public a general right of access to the Conservation Park but allows access for passive recreation along the Nature Trail and Overlook Area.
The City has expressed our concerns with the Trails and Overlook Areas being closed to the public and have been patient with CNLM as you determined a plan for reopening. This reopening effort as illustrated last week is not sufficient and does not meet the requirements set forth in the Headlands Development and Conservation Plan. To that end the City will be exercising our rights under the Conservation Easement to open the trail for passive recreation daily beginning Thursday October 28th from Sunrise – 5:00 pm.
Thank you,
Jeff Rosaler
Community Development Manager
City of Dana Point | www.DanaPoint.org
(949) 248-3587 | jrosaler@danapoint.org

From: **Deborah Rogers** <drogers@cnlm.org>
Date: Wed, Oct 28, 2020 at 10:40 PM
Subject: Re: (S033) City of Dana Point proposes to undermine CNLM's safe trail use plan
To: JEFF ROSALER <JROSALER@danapoint.org>
Cc: Korie Merrill <kmerrill@cnlm.org>, David Monroe <dmonroe@cnlm.org>, Willis, Andrew@Coastal <andrew.willis@coastal.ca.gov>, Jonathan Snyder <Jonathan_D_Snyder@fws.gov>

Jeff:

The timing of your message gives little opportunity for response, and none for discussion.

CNLM staff have worked diligently to both monitor health and safety considerations over recent months and assess the opportunity for re-opening the trail at our Dana Point Preserve, as well as to develop a trail re-opening plan that focused on both protecting the safety of the visiting public (and CNLM staff), as well as protecting the highly significant (i.e., endangered and threatened species) conservation values of our preserve.

The well-planned trail re-opening was launched two weeks ago (October 15th) and was focused on providing the maximum likelihood of success -- i.e., protection of health/safety and of conservation values. As we had indicated we would do, we provided you with updates during that process and advance notice of the trail re-opening, details of which (as you know) are on our website: https://www.cnlm.org/portfolio_page/dana-point/

With four public access events/days now experienced, and the information gained from those experiences, our intent is to extend our plan to include more access as we have indicated to you and the public on our website. The gradual re-opening is necessary. Although staff have observed general compliance with safety 'rules', we still observe approximately 73% of the visiting public not wearing masks even though encounters within 6 ft of others on trail are likely to occur or cannot be predicted. Further, we are confused about your interpretation of public reaction because our staff and volunteers (who are on the ground at Dana Point Preserve and hearing reaction first hand) have heard increasingly positive reaction from the visiting public about our concern to open the trail in a manner that is focused on a safe experience and the manner in which this has been done. I believe you understand that such careful planning, and now management, of trail access has involved considerable additional effort and staff resources.

We are also confused about your reference to the conservation easement held by the City of Dana Point. The grantee's responsibilities are towards ensuring the conservation values of the preserve are protected. Uncontrolled public access is, in fact, prohibited Section 5.1(o). While the City has access to the preserve for ensuring the protection of conservation values (Section 4.1), it is not indicated that the City has the right to extend that uncontrolled access to the public. Through our re-opening plan we are attempting to provide safe, controlled public access and that which could lead to more access, when demonstrated to be warranted, and with no evidence of impact to the conservation values.

As to your intended re-opening schedule, this is without rationale. Further, according to the Local Coastal Program, CNLM can seek approval from the Wildlife agencies to reduce public access hours as needed for maintenance and safety. We have engaged USFWS and California Coastal Commission staff regarding decisions on trail use, public safety, and impacts to conservation values. The schedule and haste of complete re-opening that you have proposed significantly heightens the risk of both unsafe visitor conditions and impacts on conservation values (as the public steps off trail to avoid each other). Unfortunately, due to the limitation of staff resources and our concern about their safety, both effects (public and endangered wildlife) are unlikely to be well documented and are supported only by common sense.

We are disappointed at your proposal to undermine our re-opening plan, without reasonable notice or sound rationale. Your proposal, as I understand it, is uncontrolled use of the trail, allowing congregation in overlook areas, creating potentially unsafe conditions and ignoring local and state guidelines to maintain physical distancing of at least six feet. This also sets in play conditions that are highly conducive to visitors trespassing onto sensitive (off-trail) areas.

Our staff intend to continue to open the trail at 9:00 a.m. and close it at 12:00 p.m. Thursdays and Tuesdays until further notice. We will continue to collect data during these opportunities to gauge how the public adheres to the established guidelines and to receive feedback from those visiting the trail.

Deborah

Deborah L. Rogers
Co-Executive Director &
Director of Conservation Science and Stewardship
Center for Natural Lands Management
Voice: (510) 799-7701

EXHIBIT E

Center for Natural Lands Management
A non-profit organization for the protection and management of natural resources

27258 Via Industria, Suite B
Temecula, CA 92590-3751
Phone: 760.731.7790
Fax: 760.731.7791
www.cnlm.org

February 26, 2021

Mr. Michael Villar
Council Member, District 5
City of Dana Point
33282 Golden Lantern St.
Dana Point, CA 92629

Delivered Via Email To: MVillar@danapoint.org

Dear Mr. Villar,

Thank you for your request for further information, on behalf of your constituents, concerning public access to the trail on our organization's Dana Point Preserve within the City of Dana Point (City). We certainly appreciate that this Preserve, with its coastal location, offers lovely vistas within a City that is fortunate to have many such beautiful viewpoints. Similarly, we appreciate the interest in being outdoors and the COVID-19 context wherein being out-of-doors—as long as this is done safely—is desirable. Our summary response—upon which we expand below—is that:

- This Preserve is not a park.
- It is owned by the Center for Natural Lands Management (a nonprofit organization charged with protecting endangered species and their habitats).
- The Preserve is neither tax- nor publicly-supported other than with modest intermittent donations.
- Public access requires not only a specifically constructed trail (with fenced boundaries and gates) but oversight by CNLM staff to help protect the fragile resources and endangered species.
- The safety of our staff, protection of the public while on a necessarily narrow trail with contact surfaces, and protection of the endangered species are important considerations.
- During the pandemic, as well as pre- and post-pandemic conditions, we must moderate public access with protection of endangered species and sensitive habitat on this small island of habitat.

During the pandemic, our public access plan has been constantly reviewed and adjusted relative to the status of the pandemic; public health and safety guidance provided by trusted federal, state, and county authorities; the structure and dimensions of the trail; and site conditions including the status of endangered species (e.g., sensitive life stages and locations). The following is a chronology of our public access efforts: In response to a state stay-at-home order we closed the trail on March 13, 2020; monitored public health status via COVID-related statistics; opened it with conditions on October 15, 2020; monitored public behavior on trails; and closed it again on December 11, 2020 following guidance of a regional stay-at-home order; and opened again on February 11, 2021 once the regional order was lifted. During the pandemic we have kept the City (Natural Resources Department) informed as well as posted notices onsite and on our website to apprise the public of these changes. Throughout this pandemic we have collaborated with trail users and taken into consideration public opinions and suggestions on how to safely open the trail, including focused sessions with some of our (local) volunteers.

The trail on our Dana Point Preserve is a narrow (3-4 feet wide) 0.5-mile trail, enclosed by a post-and-cable trail fence. The size and configuration of the trail do not allow for visitors to practice social distancing with two-way traffic flow. One-way trail use was implemented to allow for the potential for safe use of the trail as long as the public complied. Without that provision, either trail users would be in very close proximity or they would step off trail in passing, thereby encroaching on sensitive habitat. Our staff are needed onsite to help guard against such encroachments and other issues: their safety is our concern as well. Our current trail conditions – one-way – are based on the best compromise for allowing access and discouraging congregation of people from different households. Further, it is our understanding that unidirectional guidelines and social distancing are in place in other parts of the region including the current practice at the Dana Point Nature Interpretive Center and the City-owned Harbor Point trail (based on signage). The difference (between Dana Point Preserve and other properties) may be that CNLM staff try to enforce trail use restrictions—for the public's safety, staff safety, and protection of endangered species.

As to the schedule for public access, that continues to be under review. As owner of the Preserve, it is at CNLM's discretion based on our responsibilities as to what days and hours the Preserve trail would be open to the public and we further condition that on health and safety guidance. Under current conditions – open two days each week – we continue to observe issues of visitors not wearing masks when approaching or passing others, stepping off trails, and even gathering in mixed groups. Although we anticipate providing more access at some point, the observed behavior of some trail users causes concern. Further, given the uncertain trajectory of the COVID pandemic, it is also prudent to only gradually and carefully provide more access. It is our assumption that it is less confusing to the public to have a regular if modest trail use schedule than to be opening and closing repeatedly. Our staff are on-site out of necessity for protecting the natural resources and attempting to influence public behavior. The majority of trail users have expressed gratitude for having a COVID-safe environment in which they can enjoy the trail without worry of exposure. We are unclear on the City's success in establishing reasonable and safe public compliance on City trails and there may be no monitoring in place to provide such an assessment.

While the City of Dana Point has numerous parks and open spaces dedicated to public use for recreation, exercise, and relaxation, there is only one place within City limits that is focused on conservation of endangered species—one of those species occurring in only two places in the wild. As the owner and manager of that place—the Dana Point Preserve—we have employed our best efforts and the greatest extent of our resources to provide public access while protecting our staff and those endangered species and rare habitat.

We will continue to keep the public informed of plans for public access both onsite with signs and on our website: www.cnlm.org.

We appreciate your outreach, Mr. Villar. And, congratulations on your recent election to the City Council. If we have not addressed your questions or those of your constituents, please let us know and we'll endeavor to do so.

Sincerely,

DL Rogers

Deborah Rogers, Ph.D.
Co-Executive Director and
Director of Conservation Science and Stewardship
Center for Natural Lands Management

EXHIBIT F

Public Access Questionnaire Regarding the CNLM Dana Point Preserve

Center for Natural Lands Management

Did you know …

- That this preserve is not a City park but a nature preserve owned and managed by a nonprofit organization (the Center for Natural Lands Management) that is home to endangered and threatened species?
- That public access must be limited to the trail to protect these species, and that this requires both trail boundaries and monitoring by staff and volunteers?
- That no taxes or City funds are used to support the Preserve?

As such we need to balance protection of these rare and highly sensitive species with public recreation. And since March 2020, we have also needed to weigh the safety of our staff and the visiting public with opportunities for access. As we work towards further reopening the trail, we seek input from you – the visiting public – to help us in determine priorities for the trail access schedule.

Please fill out this questionnaire and return it to our staff or volunteers. **THANK YOU!**

1) You are a resident of (Please circle one)**:**		**2) Is this your first visit to the Preserve?**	
Dana Point	Orange County	Yes	No
California	Elsewhere		

For the rest of the questions, please respond as though these were 'normal' (non-pandemic) conditions.

3) If you answered No to question 2, approximately how often do you (normally) use the trail?

Every day it is open.	Once a week.	A few times a week.
Once a month.	A few times a year.	Other_________________

4) Which days of the week are you more likely to use the trail? (Please circle all that apply)

Everyday	Tuesday	Thursday	Saturday
Monday	Wednesday	Friday	Sunday

5) What times of the day are you more likely to use the trail? (Please circle all that apply)

07:00 AM – 09:00 AM	12:00 PM – 2:00 PM	4:00 PM – 6:00 PM
09:00 AM – 12:00 PM	2:00 PM – 4:00 PM	6:00 PM – 8:00 PM

Please add any comments that you would like to offer regarding public use of the trail. Thank you!

EXHIBIT G

Center for Natural Lands Management
A non-profit organization for the protection and management of natural resources

27258 Via Industria, Suite B
Temecula, CA 92590-3751
Phone: 760.731.7790
Fax: 760.731.7791
www.cnlm.org

January 28, 2022

Jeff Rosaler
Community Development Manager
City of Dana Point
jrosaler@danapoint.org

Bernie Villanueva-Grzecka
Natural Resources Protection Officer
City of Dana Point
BVillanueva@danapoint.org

Dear Jeff and Bernice:

We are providing, for your review, the enclosed draft Update to the Habitat Management and Monitoring Plan for Dana Point Headlands Biological Open Space, which addresses public access to the Dana Point Preserve. If you have any comments, we would appreciate receiving them -- in writing or orally or both -- no later than February 17, 2022.

Thank you.

Sincerely,

DL Rogers

Deborah L. Rogers, Ph.D.
Co-Executive Director and
Director of Conservation Science and Stewardship
Center for Natural Lands Management
Voice: (510) 799-7701
Email: drogers@cnlm.org

Attached: Draft Update to the Habitat Management and Monitoring Plan for Dana Point Headlands Biological Open Space: Balancing public access with endangered species protection

PROOF OF SERVICE

Center for Lands Management v. City of Dana Point, and Cross Action, Superior Court of Orange County Case No. 30-2021-01219668-CU-OR-CJC

STATE OF CALIFORNIA, COUNTY OF LOS ANGELES

At the time of service, I was over 18 years of age and not a party to this action. I am employed in the County of Los Angeles, State of California. My business address is 707 Wilshire Blvd., 24th Floor, Los Angeles, CA 90017.

On August 2, 2022, I served true copies of the following document(s) described as **DECLARATION OF DEBORAH L. ROGERS, PH.D. IN OPPOSITION TO CITY OF DANA POINT'S MOTION FOR PRELIMINARY INJUNCTION** on the interested parties in this action as follows:

Patrick Munoz, Esq. Jennifer Farrell, Esq. Robert Owen, Esq. RUTAN & TUCKER LLP 18575 Jamboree Road, 9th Floor Irvine, CA 92612	Attorneys for Defendant and Cross-Complainant CITY OF DANA POINT Telephone: (714) 641-5100 Facsimile: (714) 546-9035 Email: pmunoz@rutan.com jfarrell@rutan.com bowen@rutan.com

BY E-MAIL OR ELECTRONIC TRANSMISSION: I caused a copy of the document(s) to be sent from e-mail address tstephens@meyersnave.com to the persons at the e-mail addresses listed in the Service List. I did not receive, within a reasonable time after the transmission, any electronic message or other indication that the transmission was unsuccessful.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on August 2, 2022, at Los Angeles, California.

Teresa Stephens

Teresa Stephens

SHAYE DIVELEY (SBN: 215602)
sdiveley@meyersnave.com
RUSSELL E. MORSE (SBN: 251057)
rmorse@meyersnave.com
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Attorneys for Plaintiff and Cross-Defendant
CENTER FOR NATURAL LANDS
MANAGEMENT

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF ORANGE

CENTER FOR NATURAL LANDS MANAGEMENT, a non-profit organization,

Plaintiff and Cross-Defendant,

v.

CITY OF DANA POINT; and DOES 1-50,

Defendants.

CITY OF DANA POINT,

Cross-Complainant,

v.

CENTER FOR NATURAL LANDS MANAGEMENT,

Cross-Defendant.

Case No. 30-2021-01219668-CU-OR-CJC

ASSIGNED FOR ALL PURPOSES TO: MICHAEL STRICKROTH, DEPARTMENT C15

DECLARATION OF ED PERT, Ph.D., IN OPPOSITION TO MOTION FOR PRELIMINARY INJUNCTION

Hearing on Continued Motion
Reservation No.: 73774314

Date:	September 19, 2022
Time:	1:45p
Judge:	Hon. Michael J. Strickroth
Dept.:	C15
Action Filed:	September 7, 2021
Trial Date:	None Set

DECLARATION OF ED PERT, Ph.D.

I, Ed Pert, declare as follows:

1. I am the Regional Manager of the South Coast Region (Region 5) for the California Department of Fish and Wildlife ("CDFW"). I have personal knowledge of the facts set forth herein, except as to those stated on information and belief and, as to those, I am informed and believe them to be true. If called as a witness, I could and would competently testify to the matters stated herein.

2. I have worked as a permanent employee at CDFW since 2000, and have extensive experience in wildlife conservation and management. I hold a Ph.D. in Fisheries and Wildlife Sciences from Virginia Tech, a M.S. in Wildland Resource Sciences from University of California, Berkeley, and a B.S., in Wildlife Management (minor Fisheries Management) from Humboldt State University. In my role at CDFW, I have worked extensively on resource and wildlife management issues, including the Dana Point Preserve ("Preserve").

3. The Preserve was created in 2005 as part of required mitigation for the Headlands Development Project. Because the Project proponent and former landowner of the Preserve is a "Participating Landowner" to the Orange County Central and Coastal Subregion Natural Community Conservation Plan/Habitat Conservation Plan ("NCCP/HCP"), the Habitat Development and Conservation Plan ("HDCP") and associated Habitat Management and Monitoring Plan for Dana Point Headlands Biological Open Space ("HMMP") were prepared to conform to the requirements of the NCCP/HCP, which addresses impacts to and conservation of the federally endangered Pacific pocket mouse (*Perognathus longimembris pacificus*, also referred to as PPM) and federally threatened coastal California gnatcatcher (*Polioptila californica californica*).

4. Based on my first-hand knowledge and ongoing involvement with the Preserve, CDFW supported approval of the HDCP based on the proposal to include, as components of the HDCP, the acquisition and permanent preservation of the Preserve by the Harry and Grace Steele Foundation and a commitment to manage this area in perpetuity for conservation purposes. These commitments were realized via the transfer of funds from the Harry and Grace Steele Foundation to the Center for Natural Lands Management ("CNLM") to purchase and manage the Preserve and

the establishment of a Conservation Easement ("CE") to protect this property in perpetuity.

5. To help ensure that the CE is enforced, and its biological values and resources are maintained, CDFW and U.S. Fish and Wildlife Service (collectively, "Wildlife Agencies") are named as Third Party Beneficiaries to the CE. This is a common practice for CDFW to safeguard against any use or threatened use of conservation lands that is inconsistent with the purpose of the CE or would affect the protected species.

6. Based on my first-hand knowledge and ongoing involvement with the Preserve and the NCCP/HCP, CDFW supported the HDCP based on the proposal to permanently protect the Preserve and manage this area and its resources using adaptive management principles, which we determined would help promote the survival and recovery of the PPM. Adaptive management makes use of management interventions and follow up monitoring to improve understanding of how a resource system works and improve subsequent decisions to help achieve management objectives. It is common practice for CDFW to require adaptive management to meet conservation goals, as environmental conditions and species needs can change over time.

7. When CDFW provided its support for the HDCP, we also did so with the understanding that the public would be granted controlled access to a trail constructed within the Preserve. Due to the small size and sensitivity of the PPM population, during development of the HDCP and HMMP, we emphasized that it would be critical to design and regulate public use to safeguard the PPM and other sensitive flora and fauna within the Preserve. To that end, the 2005 HMMP contemplated that the Habitat Manager (here, CNLM) would monitor public access and its consequences within the Preserve, and would apply adaptive management to minimize impacts to individuals or populations of NCCP/HCP Identified Species from public access (URS and CNLM 2005). Under the CE, CNLM also has an obligation to periodically update the HMMP to govern uses within the CE, "…consistent with best adaptive management practices and in consultation and coordination with [the Wildlife Agencies]" (Conservation Easement Section 5.1).

8. Per the CE, CNLM coordinated with us on the recent update to HMMP. We provided our feedback, with USFWS, in a written letter to CNLM and the City of Dana Point on March 23, 2022. A true and correct copy of that letter, which I helped prepare, is attached as

Exhibit A.

9. CNLM addressed our comments and released the updated HMMP in April of this year. A true and correct copy of the 2022 HMMP Update, which I received from CNLM, is attached as **Exhibit B**. CDFW treats the 2022 HMMP as updating and superseding portions of the original 2005 HMMP prepared by CNLM and URS for the management necessary to ensure ecologically sustainable habitat conservation areas within the Preserve.

10. We recognize that providing the public access to nature is important for maintaining support for conservation efforts and that many members of the public will have an interest in the level of public access in the Preserve. However, human disturbance of wildlife from non-consumptive recreation (e.g., hiking) can cause altered spatio-temporal habitat use, decreased survival and reproduction, reduced population abundance, and extirpation of animals from otherwise suitable habitat (see review by Dertien *et al*. 2021). The status of the PPM population further suggests a conservative management strategy is warranted that focuses on ameliorating all potential threats to this population, including recreation use, habitat senescence, Argentine ants, and other factors discussed in the HMMP update. Thus, our support for CNLM's modification to the HMMP is based on the current status of the Dana Point PPM population and of the species as a whole, which warrants a conservative management strategy within each of the extant populations.

11. If CNLM is deprived of its authority to maintain the current hours of public access for the Preserve and to modify them as needed to address the needs of the protected species and environmentally sensitive habitat areas of the Preserve, CNLM will be unable to implement the adaptive management practices required to safeguard the PPM and other sensitive flora and fauna within the Preserve. Such adaptive management practices are necessary to minimize impact to NCCP/HCP Identified Species. CDFW does not support the City of Dana Point's requirement that the Preserve trail be open for public access daily from 7 am to sunset at this time as that level of public access would not promote the survival and recovery of the PPM. In the future, if other management actions can be identified, implemented, and monitored to determine any adverse or beneficial effects on PPM or other target species, it may be possible to modify the public access component; however, this should only be pursued with the approval and under close oversight by

the land manager (CNLM) as part of the adaptive management program approved by the Wildlife Agencies.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on this 25th day of August, 2022, at San Diego, California.

DocuSigned by:
Edmund Pert
A87CE992DB57479...
9/2/2022

Edmund Pert

5185068.1

EXHIBIT A

U.S. FISH AND WILDLIFE SERVICE
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

CALIFORNIA DEPARTMENT OF
FISH AND WILDLIFE
South Coast Region
3883 Ruffin Road
San Diego, California 92123

In Reply Refer to:
FWS/CDFW-OR-2022-0016223

March 23, 2022
Sent Electronically

Deborah L. Rogers
Co-Executive Director and Director of Conservation Science and Stewardship
Center for Natural Lands Management
27258 Via Industria, Suite B
Temecula, California 92590-3751

Subject: Update to the Habitat Management and Monitoring Plan for Dana Point Headlands Biological Open Space, City of Dana Point, California

Dear Deborah Rogers:

This letter responds to the "Draft Update to the Habitat Management and Monitoring Plan [HMMP] for the Dana Point Headlands Biological Open Space" dated January 28, 2022, that has been prepared by the Center of Natural Lands Management (CNLM) to address a proposed change to public access policies for the Dana Point Preserve (also known as the Headlands Conservation Park; hereafter "Preserve") that is owned and managed by CNLM.

History of the Preserve and the HMMP

The original HMMP (URS and CNLM 2005) was prepared in association with the City of Dana Point's development approval for the Headlands Development and Conservation Plan (HDCP), which included amending the Dana Point Local Coastal Program to accommodate residential and visitor/recreational commercial land uses along with the establishment of 34 acres of Conservation Open Space and 34.5 acres of Recreation Open Space on the overall 121-acre Dana Point Headlands Property. Because the HDCP project proponent and former landowner of the Preserve is a "Participating Landowner" to the Orange County Central and Coastal Subregions Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP), the HDCP and associated HMMP were also prepared to conform to the requirements of the NCCP/HCP, which addresses impacts to and conservation of the federally endangered Pacific pocket mouse (*Perognathus longimembris pacificus*; PPM), federally threatened coastal California gnatcatcher (*Polioptila californica californica*), and other "Identified Species" throughout much of Central and Coastal Orange County, including the Dana Point Headlands property.

Among the provisions of the NCCP/HCP was a commitment by the landowners to grant the U.S. Fish and Wildlife Service (Service) and the California Department of Fish and Wildlife (Department)—jointly the Wildlife Agencies—an option to purchase a 22-acre portion of the Dana Point Headlands property designated as a "Temporary Pacific Pocket Mouse Preserve" should the Wildlife Agencies determine that "…continuance of the preserve is necessary to

ensure the survival and recovery of the species [PPM]" (NCCP/HCP Implementation Agreement Section 8.3.2 (a)(1)(F), pp. 85-86). Ultimately, the Wildlife Agencies waived our purchase option and supported approval of the HDCP based on the proposal to include as components of the HDCP the acquisition and permanent preservation of the Temporary Pacific Pocket Mouse Preserve by the Harry and Grace Steele Foundation and a commitment to manage this area in perpetuity for conservation purposes. These commitments were realized via the transfer of funds from the Harry and Grace Steele Foundation to CNLM to purchase and manage the Temporary Pocket Mouse Preserve and the establishment of a Conservation Easement (CE) to protect this property in perpetuity.

To help ensure that the CE is enforced, and its biological values and resources are maintained, the Wildlife Agencies are named as Third Party Beneficiaries to the CE, and CNLM has an obligation to periodically update the HMMP that helps govern uses within the CE "…consistent with best adaptive management practices and in consultation and coordination with [the Wildlife Agencies]" (Conservation Easement Section 5.1). Accordingly, you have requested that the Wildlife Agencies review and comment on the proposal to update the HMMP, which seeks to update the policies governing controlled public access to develop "…a public access schedule that more appropriately addresses a balance between public access and protection of sensitive (even endangered) natural resources" (HMMP Update, p. 24). Based on the status of PPM within the Preserve and the available information regarding the potential effects of outdoor recreation on wildlife, we support the proposed changes to the public access schedule, but we acknowledge that additional information regarding the effects of trail use on PPM in adjacent habitat would help inform future management of public access. Additional reasoning is provided below.

Status of PPM in the Preserve

Monitoring of PPM within the Preserve has documented dramatic fluctuations in the PPM population. Since the re-discovery of PPM in 1993, several comprehensive live-trapping efforts in the Preserve have detected fewer than 10 animals. There have also been two documented peaks in abundance. The first peak occurred in 2009 when 82 individuals were captured in May of that year (Brylski *et al*. 2010), following several years of habitat management and just prior to the Preserve being opened to public access. After 2009, the population began to decline, and by 2017 a comprehensive live-trapping effort detected just six individuals (Miller 2017).

Following the very low population numbers documented in 2017, we worked closely with CNLM to increase its capacity to manage habitat and increase the abundance of PPM within the Preserve. Through grant funding provided to CNLM by the Service, from December of 2019 through February of 2020, CNLM was able to create the more open habitat conditions preferred by PPM within 4.3 acres of the Preserve by removing dead shrubs, woody debris, leaf litter, and duff. Subsequent results from live-trapping surveys performed in June and July of 2020 were encouraging, with the capture of 77 mice suggesting the population rebounded and responded positively to the habitat management effort (Brehme *et al*. 2021).

However, as noted in the proposed modification to the HMMP, it is challenging to attribute the observed fluctuations in the PPM population to any single factor. Between 2009 and 2017, when

public visitation within the Preserve was increasing and the PPM population was in decline, there were also periods of drought and changes in the age structure and composition of the vegetation community. Following the 2019–2020 habitat management efforts and the observed increase of the PPM population, there was no public access allowed within the Preserve (see "Public Access in the Preserve" below). Regardless of the cause of the observed fluctuations in the PPM population, the monitoring results clearly illustrate that this population remains vulnerable to extirpation due to its isolation and small population size.

Additionally, even with the apparent rebound in numbers of mice within the Preserve, genetic studies suggest the Dana Point population has suffered a severe loss of genetic variation since its rediscovery (Swei *et al*. 2003; Wilder *et al*. 2020), likely associated with the population going through bottlenecks such as that observed in 2017. Loss of genetic variation increases the risk of extirpation of small populations because it results in the loss of adaptive potential (i.e., the ability of a species to evolve and adapt in response to changing conditions) and can lead to inbreeding depression (reduced fitness resulting from mating between close relatives; Franklin 1980). Thus, another focus of our efforts to recover PPM at Dana Point and elsewhere has been to formulate a genetic management strategy for the species.

Because the Dana Point population is genetically differentiated from the other two extant populations on Marine Corps Base Camp Pendleton (Swei *et al*. 2003; Wilder *et al*. 2020), and mice at Dana Point may have a different chromosome number than mice on Camp Pendleton (Shier and King 2020), significant questions remain whether it is appropriate to pursue genetic rescue (i.e., augment genetic variation within a population by outcrossing with individuals from another population) at Dana Point for fear of introducing outbreeding depression (decreased fitness of progeny from crosses between divergent populations). This underscores how critical it is to conserve the remaining genetic variation within the Dana Point population by maximizing the size of this population and preventing further bottlenecks while additional studies are performed to inform the genetic management strategy.

Public Access in the Preserve

When we provided our support for the HDCP, we did so with the understanding that the public would be granted controlled access to a trail constructed within the Preserve. Due to the small size and sensitivity of the PPM population, during development of the HDCP and HMMP we emphasized that it would be critical to design and regulate public use to safeguard PPM and other sensitive flora and fauna within the Preserve. Among the provisions incorporated in the HDCP and HMMP to address this concern were: fencing the perimeter of the Preserve, placing lockable gates at the trail heads, aligning and minimizing the width of the trail to minimize impacts to sensitive resources, fencing the trail alignment to discourage off-trail use, prohibiting the public from bringing dogs within the Preserve, and restricting public use of the trail to daytime hours. The HMMP further contemplated that the Habitat Manager (CNLM) would monitor public access and its consequences within the Preserve and would apply adaptive management to minimize impacts to individuals or populations of NCCP/HCP Identified Species from public access (URS and CNLM 2005).

To assist CNLM monitor public visitation to the Preserve, during 2010 we worked with the Natural Communities Coalition (the non-profit entity that helps oversee implementation of the NCCP/HCP) to fund the acquisition of trail counters to place at each of the trail heads. Public visitation data collected by CNLM since 2010 shows that the popularity of the Preserve has grown appreciably, with the estimated number of annual visitors nearly doubling between 2011 and 2017 to almost 250,000 visitors per year.

As discussed in the proposed modification to the HMMP, human disturbance of wildlife from non-consumptive recreation (e.g., hiking) can cause altered spatio-temporal habitat use, decreased survival and reproduction, reduced population abundance, and extirpation of animals from otherwise suitable habitat (see review by Dertien *et al*. 2021). Thus, it is important to consider modifying public access within the Preserve to ameliorate the threat that the increasing popularity of the Preserve to the public may present to the Dana Point PPM population. The status of this population further suggests a conservative management strategy is warranted that focuses on ameliorating all potential threats to this population, including recreation use, habitat senescence, Argentine ants, and other factors discussed in the HMMP update.

Adaptive Management of the Preserve

The Wildlife Agencies supported the HDCP based on the proposal to permanently preserve the Temporary Pacific Pocket Mouse Preserve and manage this area and its resources using adaptive management principles, which we determined would help promote the survival and recovery of PPM. Adaptive management makes use of management interventions and follow up monitoring to improve understanding of how a resource system works and improve subsequent decisions to help achieve management objectives. In developing the proposal to reduce public access to benefit sensitive resources within the Preserve, CNLM has considered the monitoring data on public use, the dynamics of the PPM population before and after restriction of public access to the Preserve due to COVID-19, and the growing body of scientific literature that indicates that even passive non-consumptive recreation can have deleterious effects on wildlife individuals and populations. Looking forward, we recommend that CNLM work with the Wildlife Agencies and others to determine how the existing monitoring program might be adjusted to better study the effects of trail use on PPM and other sensitive species. Refining the PPM monitoring methodology to use track tubes and live trapping to more frequently estimate PPM distribution and abundance on the Preserve, including documenting any changes in PPM distribution during days that the public is using the trail and days that they are not, should provide the information necessary to allow CNLM to continue to adjust public access and management effort in response to the changes in PPM populations and to adaptively manage the Preserve.

We recognize that providing the public access to nature is important for maintaining support for conservation efforts and that many members of the public will have an interest in the level of public access in the Preserve. Thus, our support for CNLM’s proposed modification to the HMMP is based on the current status of the Dana Point PPM population and of the species as whole, which warrants a conservative management strategy within each of the extant populations. However, we wish to emphasize the importance of accompanying this management change with implementation of a more robust public outreach and education program that includes the use of

augmented signage and information displays. We also recommend implementing an updated species-specific monitoring plan to help address remaining questions about the effects of public access and other questions of concern to PPM management and recovery. The Wildlife Agencies are available to assist CNLM with an update to the species monitoring component of the HMMP.

Finally, we note that the plan includes guidance for establishing hours of operation (days of week/hours per day) for the public access trail but does not specify what those hours will be. We recommend including a figure that explicitly identifies the location of the trail where public access is permitted and a discussion of other allowable and prohibited public uses in the Preserve (e.g., access for pets or use of drones). To avoid confusion or different interpretations of allowable public use, we recommend these items be included as a component of the update to the HMMP.

We appreciate the opportunity to comment on the draft update to the HMMP and CNLM's management of the Preserve. We look forward to continuing to work cooperatively with CNLM to adaptively manage the Preserve and public access to continue to benefit PPM. Should you have questions or wish to discuss any of the above, please contact William Miller[1] with the Service at 760-431-9440, extension 206, or Emily Gray[2] of the Department.

Sincerely,

JONATHAN SNYDER Digitally signed by JONATHAN SNYDER Date: 2022.03.23 12:04:02 -07'00'

Jonathan D. Snyder
Assistant Field Supervisor
U.S. Fish and Wildlife Service

DocuSigned by: David Mayer D700B4520375406... 3/23/2022

David A. Mayer
Environmental Program Manager
California Department of Fish and Wildlife

cc:
Jeff Rosaler, City of Dana Point
Korie Merrill, CNLM

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EXHIBIT B

Update to the Habitat Management and Monitoring Plan for Dana Point Headlands Biological Open Space

Prepared by: Korie C. Merrill, M.S.
Preserve Manager

Michelle A. Labbé, M.S.
Conservation Analyst

Deborah L. Rogers, PhD
Co-Executive Director &
Director of Conservation Science and Stewardship

Center for Natural Lands Management

Center for Natural Lands Management
www.cnlm.org

April 15, 2022

Update to the Habitat Management and Monitoring Plan for Dana Point Headlands Biological Open Space

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1. Preface

The approximately 29-acre Dana Point Preserve (Preserve) was created in 2005 when it was conveyed to the Center for Natural Lands Management (CNLM), which has owned and managed it ever since in order to (1) protect the Preserve's rare coastal sage scrub community and habitat for the threatened coastal California gnatcatcher (*Polioptila californica californica)* and endangered Pacific pocket mouse (*Perognathus longimembris pacificus*) and (2) provide controlled public access on the trail through the Preserve offering views of the Pacific Ocean coastline.

The City of Dana Point (City) planned for the Preserve by adopting on September 22, 2004, the Headlands Development and Conservation Plan (HDCP) as part of its Local Coastal Plan (Headlands Reserve LLC and City of Dana Point 2004). The HDCP provides for establishment of the Preserve, designates it for Conservation Open Space, "the most restrictive land use within the [Headlands] project," requires long-term preservation and management of habitat for sensitive species, including the Pacific pocket mouse, provides for a non-profit trust to manage the Preserve in conjunction with the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW), and calls for recording a conservation easement to ensure the Preserve remains conserved open space. Noting that the Preserve "includes a limited bluff top trail . . . and limited visitor access to the coastline and natural environment," the HDCP provides that "[b]alancing the desire for limited public access and views along the perimeter, the [Preserve] is designed to protect a number of sensitive flora and fauna, including the Pacific pocket mouse" and "[a]s a result, and to protect this natural resource from overuse, only limited portions of the area will accommodate passive uses" and the "non-profit entity will establish hours of operation for the bluff top trail" (Headlands Reserve LLC and City of Dana Point 2004). Owing to its experience and expertise managing habitat for endangered species, CNLM was selected to be that non-profit entity.

The City authorized development of the Headlands Project, including the Preserve, under the California Coastal Act by issuing Coastal Development Permit 04-23 (Permit or CDP) on January 19, 2005 (City of Dana Point 2005). The CDP specifies that a “pedestrian trail of decomposed granite/gravel shall provide controlled access to the coastal bluff top” and requires all development to “be consistent with and comply with all requirements of the HDCP.” It also calls for preparation of a habitat management plan to before disturbance of any environmentally sensitive habitat area (ESHA) and protection of preserve ESHA by dedication of a conservation easement to the City or other appropriate entity.

In keeping with the CDP, the Habitat Management and Monitoring Plan (HMMP) was prepared on April 18, 2005 (URS and CNLM 2005). The HMMP confirms that its implementation “will comply with and conform to the relevant requirements” of the HDCP and other approvals. The HMMP addresses various aspects of the coastal scrub ecosystem, endangered and threatened species, other sensitive species, and public use and education at length, and addresses public access on the Preserve trail only briefly. Confirming that “[c]ontrol of public access must be consistent with the [CDP],” it states that “[c]ontrol of public access to the [Preserve] will be the responsibility of CNLM in consultation with the City of Dana Point” and “[h]ours of operation to the [Preserve] and other Biological Open Space [i.e., areas owned by the City] will be 7:00 am to sunset,” which it clarifies means “the anticipated hours of operation.” (URS and CNLM 2005).

On December 20, 2005, CNLM, the owner of the Preserve, recorded a Conservation Easement (CE) over the Preserve to the City, which the City accepted as compliance with the CDP condition calling for a conservation easement (CNLM and City 2005). The purpose of the CE is “to ensure that biological values and resources in the [Preserve] continue to exist in perpetuity, and to prevent any use of the [Preserve] that will materially impair or interfere with such values and resources.” The CE generally prohibits use of the Preserve except as otherwise provided in the HDCP, CDP, and HMMP and specially prohibits “[u]ncontrolled public access.” It expressly permits certain portions of the Preserve to be open to the public and specifies that “such public access shall be controlled and shall be limited to the nature trail and overlook areas to be constructed on the [Preserve].” The CE expressly calls for the HMMP to be “updated at least every five years by [CNLM] consistent with best adaptive management practices and in consultation and coordination with United States Fish and Wildlife Service (“USFWS”) and the California Department of Fish and Game (“CDFG”).”

Pursuant to that direction and authorization, CNLM has prepared this Update to the HMMP with respect to public access to the Preserve. CNLM consulted and coordinated with USFWS and CDFW with provision of an earlier (January 28, 2022) version of this document. That draft document was also provided to the City and to the US Geological Survey (USGS)—a research-focused agency within the Department of the Interior. Formal comments were received from USFWS and CDFW through a joint letter (USFWS and CDFW 2022); informal comments were received from USGS. No comments were received from the City. The current document reflects not only consideration of comments received from the wildlife agencies and USGS, but additional literature discovered or reviewed since January 28, 2022, updates in visitor data, and information provided through informal means by several scientists.

CNLM has previously prepared annual work plans for the Preserve that provided specific and direct guidance for annual management activities. While generally consistent with the HMMP, the annual work plans did not formally update the HMMP itself. The work plans were provided annually to USFWS and CDFW for consultation purposes. CNLM is currently undertaking to prepare an update of the entire HMMP for the Preserve, which will address all aspects of management and biological monitoring. While preparation of that overall update is in progress, CNLM decided to complete this Update for the public access aspects of the HMMP because of: (1) the substantial amount of scientific information and direct management experience that have become available since 2005 that influence the conception of “controlled” public access relative to protection of onsite natural resources, including the information gained from recent COVID-related closures; and (2) the significant increase in the amount of public visitation since the trail was opened to the public in 2009. This Update to the HMMP was undertaken in consultation and coordination with USFWS and CDFW, as provided by the CE. This Update supersedes and replaces those portions of the HMMP addressing public access to the Preserve. To the extent there is any conflict between the HMMP and this Update, the terms of this Update control.

The HMMP also generally describes management for approximately 22 acres of property owned by the City, including Harbor Point Park, Hilltop Park, and South Strand Biological Open Space. This Update pertains only to CNLM's preserve and does not address or change management of the City's property.

2. Executive Summary

The approximately 29-acre Dana Point Preserve (Preserve), located within the City of Dana Point in Orange County, California, has been owned and managed by the Center for Natural Lands Management (CNLM) since December 2005. The Preserve, in addition to supporting a rare coastal sage scrub community with considerable biodiversity, provides habitat for (and extant occurrences of) two listed species—the (federal) threatened coastal California gnatcatcher (*Polioptila californica californica)* and the (federal) endangered Pacific pocket mouse (*Perognathus longimembris pacificus*). The first management plan for the Preserve (Plan) was drafted in 2005 but provided little information regarding public access, although noting that excessive or uncontrolled access could result in habitat degradation. A conservation easement, granted to the City by CNLM in 2005, is intended to ensure that biological values and resources in the Preserve continue to exist in perpetuity, and to prevent any use that would materially impair or interfere with such values and resources. For much of the period between 2009—when the trail on the Preserve was first opened to the public—until the COVID-related substantial closure in 2020, the trail was open to the public often seven days per week, typically 7:00 a.m. to sunset. CNLM staff closed the trail or modified public access as needed for trail maintenance, in particular, and for other reasons including protection of sensitive nesting locations. However, there was no underlying research or principles that supported this amount of public access in relation to the need to protect the sensitive onsite natural resources. Since then, a substantial and growing base of scientific literature shows that impacts from the visiting public in natural areas—even if staying on trails and only walking—can be significant. Those impacts can arise from the sight, sounds, vibrations, movements, and smells of the public. Further impacts can arise when the visiting public engages in behaviors that are prohibited on the Preserve, including walking off trail (and thus potentially crushing pocket mouse burrows, etc.), making biological collections, digging or erecting items on the Preserve, flying drones, smoking, depositing trash, and bringing other animals onsite. In spite of clear statements on signs of prohibited activities and CNLM staff efforts to control the public, all of those behaviors have been observed on the Preserve. Further, those impacts are additive with other impacts that are less controllable, including those from emergency personnel servicing some public safety issue and other threats such as climate change, pathogens that threaten species, and a widespread Argentine ant irruption correlated with adjacent developments.

The substantial number of studies that describe impacts from public presence in parks, preserves, and open spaces was augmented by data related to the Preserve's recent COVID-related closures. That unanticipated experimental opportunity, although arising from dire circumstances, provided new and undeniable evidence of the negative impacts on many aspects of natural systems and species from public recreational use since 2009.

The number of visitors using the Preserve trail since its inception in 2009 has risen dramatically. (References in this document to "number of visitors" that were recorded on the Preserve is more accurately defined as "number of counts by the infrared trail counters." See section 4.2 below.) CNLM started measuring public visitation in 2011. By 2017, the average number of visitors per day had doubled from 345 per day to 673 per day. Due to issues with the automated counters, data from 2018 and 2019 were collected only intermittently and were not reliable. When visitation data collection confidently resumed in 2020, the upward trend had continued (averaging 713 visitors per day) until the Preserve trail closure due to public health directives related to controlling COVID-19.

The Preserve trail was closed for several months in 2020 and was re-opened gradually later that year and into 2021. The Preserve trail has been open to the public on a stable schedule of three days per week, eight hours per day since mid-June 2021. During that time, the average number of visitors (504 per day) has been somewhat higher than the average across 2011-2017 (444/day) but much reduced from that in 2016 (613 per day), 2017 (673 per day), and the early 2020 observations of 713 per day. To summarize, based on experience in 2020-2022, reduction in number of days per week and hours per day that the trail is open to the public, resulted in a decrease in daily (and weekly and annual) number of visitors onsite.

Although direct impacts on the Preserve's natural resources are difficult to ascertain and fluctuations in the wildlife populations onsite no doubt reflect multiple influences, there is evidence of decreased Pacific pocket mouse presence after the trail initially opened in 2009, and an increase in the onsite population after the trail was closed to the public in 2020.

Review of scientific literature included many specific studies as well as several review papers that were meta-analyses of a large body of scientific literature on potential impacts of public visitation and recreation on natural resources. Although results are necessarily conditioned by context, the vast majority of the studies indicated impacts on natural resources from public use (even "passive recreation"), and the majority of those were negative impacts. Impacts can occur at the level of individual animals (e.g., stress, avoidance of an area because of public presence, interruption of feeding or mating activities) and scale up to the population level (e.g., reduction in reproduction and population size). The potential for habituation (i.e., getting "used to" public use of the area) was reviewed in the literature. This effect is not well studied but results from studies of other species suggest that the stimulus (in this case, public presence) would still most likely cause an impact, even if habituation reduced the degree of it.

Furthermore, for habituation to occur, the stimulus should be similar and predictable—but public presence on the trail is ever-changing in its composition of types and durations of sights, sounds, smells, movements, and vibrations, thus lessening the likelihood of habituation. As such, there is little evidence that the species on the Preserve simply “get used to it” and, if they do, it would still be at a cost and may even be maladaptive.

This review of data, literature, management experience, and principles of conservation biology has resulted in strong evidence of the need to adjust the amount of public visitation in an effort to protect the very sensitive species and ecosystem on the Preserve. Further, it confirms that the earlier employed hours of operation (days per week, hours per day) did not anticipate increases in public visitation over time and was not informed by the large body of scientific knowledge now available on the topic of impacts of “passive” recreation on natural resources. If the only goal pertaining to the Preserve were to protect the Pacific pocket mouse, the most protective strategy would be to prohibit public access. The Preserve is an exceedingly small area of habitat, only 29 acres, and is surrounded by development that destroyed much of the original similar habitat. While CNLM staff and partners have been working to manage other threats to species’ survival (especially Pacific pocket mouse) on the Preserve, including unsuitable vegetation composition and Argentine ants, public access has been a growing threat. Although the guiding concept for controlling public access must first and foremost be protecting habitat and species consistent with the purpose of the Preserve, additional concepts include maintaining reasonable public access to allow enjoyment of the Preserve, reducing the amount of visitation to adjust for increasing rates over time, continuing to provide access for emergency and research use, enhancing CNLM’s outreach towards providing the public with information about the sensitive natural resources as well as impacts from visitors, and continuing to monitor public visitation, natural resources, and relevant scientific literature so as to make future adjustments as needed.

Based on the rigorous review of scientific literature, the results of data analysis and experience based on Preserve conditions, and input from wildlife agency personnel and other scientists, changes to the public access schedule include reducing the hours of operation of the trail to reduce the overall amount of visitors on the trail, better avoidance of low-light periods of public access (shifting to later morning access and earlier afternoon closures), and providing no public access on some days of the week. In their review of an earlier draft that included these changes, the wildlife agencies concurred, indicating that: "Based on the status of PPM within the Preserve and the available information regarding the potential effects of outdoor recreation on wildlife, we support the proposed changes to the public access schedule" (USFWS and CDFW 2022). This Update also includes planned continuation of monitoring of public use and natural resource conditions, and outreach to the public to provide information on the sensitivity of the onsite natural resources so as to assist in a broader appreciation of the interactions between public presence and wildlife impacts.

The processes of information gathering, analysis, and adjustments will continue—this being consistent with the "best adaptive management practices and in consultation with the wildlife agencies" that is described in the conservation easement (CNLM and City 2005). As part of adaptive management, trail hours will be provided to the public through an "Hours Notice". This information will be published on the CNLM website and posted at the Preserve.

3. Introduction

The Preserve is small (relative to its intended conservation purpose), has distinct and hard edges on most boundaries (being bounded by the Pacific Ocean on its western boundary and by hardscaped City streets and residential development on most of the rest of its perimeter; Figure 1), and is occupied by two listed species within a fragile and rare suite of landscape features. Those sensitive conservation values and challenges to sustainability might often indicate the need to limit any discretionary activities that could negatively impact the natural resources onsite. Nevertheless, access to the Preserve is provided to the general public for certain recreational activities. The Preserve is located within the California Coastal Zone and documents related to the Preserve's acquisition by CNLM indicate that the property be set aside as conservation open space, a trail be created, that limited and controlled public access be provided, and that CNLM determine and establish hours of operation of the trail. Accordingly, a trail was designed and created on the Preserve, and initially opened for public access in December 2009.

The Preserve is protected with a wildlife-friendly, six-foot-high iron fence (Figure 2) or concrete wall on all sides except the coastal bluff-tops and the border with Hilltop Park. CNLM's public access trail can be accessed by the visiting public from two locations with clearly marked gates—Scenic and Dana Strand (Figures 2 and 3). The trail is approximately ½ mile in length and includes five overlook areas (with benches and/or educational signs). Both the trail and overlook areas are well defined, enclosed by a post-and-cable trail fence. Any off-trail use would require intentionally climbing through or over the fence. Further, the trail meanders through the Preserve exposing the majority of it to potential public use impacts (i.e., within 100 meters of the trail). Gates are closed at all times except when individuals are entering and exiting the Preserve and are controlled by automatic devices powered by solar panels. The gates are locked during those hours of operation when the trail is not open for public access. Signs and interpretive panels provide information about the Preserve, including allowable (e.g., hiking, running, and wildlife viewing) and prohibited (e.g., collecting materials, smoking, off-trail use, drone use, pets, bicycles, etc.) activities for trail use (Figures 2 and 3). The prohibited activities listed on the signs are those most commonly encountered (or queried by the public) but are not an exhaustive list. As new types of potentially impactful recreation arise or studies indicate impacts from previously allowed activities, this public information is revised. Informational kiosks are also located at each gate with maps showing the trail and the list of trail use rules. The public also has access to informational brochures in the Nature Interpretive Center, created by CNLM and the City, that provide in addition to allowed and prohibited activities, a map of the trail, information on the common plant and bird species seen from the trail, and a list of alternative nearby areas where dogs are allowed on trails.

Figure 1. Overview of the CNLM Dana Point Preserve with boundary, trail, and gate features. The trail is the muted line within the Preserve area (bounded by a white line) and shows the overlook areas.

As described in the Conservation Easement (CE), “public access shall be controlled and shall be limited to the nature trail and overlook areas” (CNLM and City, 2005). In the CE, permitted public use was described as “passive recreation” with uses that could include, but were not limited to, walking, hiking, jogging, and bird watching. Notably, the CE continues to provide context for public use with the statement: “Notwithstanding the foregoing, this Conservation Easement does not convey to the public a general right of access to the Conservation Park but allows access for passive recreation along the Nature Trail and Overlook Areas.”

Since the trail was opened to the public in December 2009, it was often open daily from approximately 7:00 a.m. to sunset. In addition to control of those hours, the trail was further controlled by CNLM whose staff closed the trail in part or in its entirety from time to time for reasons that have included the nesting locations of gnatcatchers near the trail (where trail use would risk nest abandonment and the death of nestlings), repair of the trail where storm events have made it unserviceable and/or unsafe, repair and maintenance of fences and other infrastructure, or other preserve management activities that would have been significantly affected by public presence or that may present a public safety risk.

As any human use of the Preserve is potentially impactful, all types of and reasons for human access should be considered in providing context for “public access”. The types of human access on the Preserve since 2005 include:

- Emergency response (including rescue, fire response, incident investigation, and potentially training of first responders)
- Management and monitoring (by CNLM staff and others designated by CNLM for these purposes)
- Access by the general public for “passive” recreation and aesthetic enjoyment
- Research
- Public education

The HDCP, HMMP, and CE call for CNLM to employ principles of adaptive management in its preservation and management of the Preserve (Headlands Reserve LLC and City of Dana Point 2004, URS and CNLM 2005, CNLM and City 2005, respectively). Adaptive management generally is a process aiming to improve management practices incrementally by designing, adjusting, and implementing plans in ways that facilitate learning from experience. The U.S. Department of the Interior has elaborated:

> Adaptive management [is a decision process that] promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders (Williams et al. 2009, National Research Council 2004).

CNLM stewardship practices reflect the principles and include the core elements of adaptive management (Rogers 2007).

In keeping with the direction and authorization of the HDCP, HMMP, and CE, this Update is both a result and a manifestation of CNLM's adaptive management of the Preserve. By this Update, CNLM endeavors to make use of what it has learned since creation of the Preserve in 2005 and opening of the trail in 2009.

Figure 2. Interior sign on the Dana Point Preserve’s Scenic Gate referring to prohibited uses. Fence type that surrounds the majority of the Preserve can also be seen.

Figure 3. Exterior sign on the Dana Point Preserve's Strand Gate referring to prohibited uses. Some information is also provided on this sign on one of the two listed species on the Preserve—the coastal California gnatcatcher.

4. Information contributions to update on public access

Since the Preserve was acquired and the HMMP written, there has been considerable accumulation of information and experience that is relevant to the update of the public access plan, including:

- CNLM management experience on the Preserve relative to public access
- Increasing use of the Preserve by the public
- The increased vulnerability of PPM due to the loss of one of the remaining populations
- Results from monitoring the two listed species onsite
- Increasing threats to the natural resources onsite
- A growing base of scientific literature that provides evidence (and scientific principles) concerning the negative impacts of public access for “passive recreation”

Each of these topics has been explored and is described below.

4.1. CNLM management experience on the Preserve relative to public access

With over sixteen years of experience in managing the natural resources onsite and over twelve years of experience in managing public access of the Preserve, considerable insight has been gained into the relationship between these activities. Providing public access involves managing the public (i.e., onsite presence of CNLM staff to the extent possible) during public access hours, patrolling for illegal access (i.e., trespass into the Preserve when closed to the public and stepping off trail when the trail is open), and the communications and public messaging to support appropriate trail use. Public access has required considerable management to discourage and help prevent inappropriate and impactful behavior including going off the trail into the Preserve’s interior or towards the bluff, bringing dogs onsite, littering, smoking, etc.

Even for public visitation that is within “preserve rules”—that is, does not involve trespass off trails or outside the hours of operation—there can be substantial impacts from the sights, sounds, smells, movements, and vibrations of public presence. The public also can vector weed seeds that introduce or exacerbate weed problems on the Preserve and could threaten food and other habitat resources for the resident wildlife.

And, as further described in Section 4.6, serious viruses or other pathogens that could be stressful, harmful, or even catastrophic for resident species can often be vectored on footwear and clothing of the visiting public. Efforts to control that effect with trail entrance disinfecting stations are difficult to enforce and probably have little effect. The public typically disregard informational signage at the trail entrances and either don't recognize the need to take precautionary steps before using the trail or refuse to do so (K. Merrill pers. comm.).

The trespassing public—those that violate any of the trail rules—can have serious impacts. Walking off trail can result in crushing Pacific pocket mouse burrows, damaging vegetation, or affecting nests or reproductive activity (seasonally dependent) of the gnatcatcher and other species. Entering the Preserve when the Preserve is closed to the public could result in the same effects but with even more risk due to the above-ground activity of the Pacific pocket mouse (and many other species) during low-light and night-time conditions.

Other examples of impactful behavior by the public not abiding by trail rules include leaving food or trash onsite (may attract predators), bringing pets (usually dogs) onto the Preserve (sights and smells from domestic animals can have serious impacts on resident wildlife), making collections of plant materials for personal or commercial landscaping purposes (thereby potentially reducing the viability, amount, or reproductive potential of those plant species), and engaging in other activities that can threaten the Preserve or its component biota including geocaching, smoking, scavenger hunting, playing recorded bird calls/songs, conducting wedding ceremonies, establishing memorials, and using drones. All these behaviors have been observed by CNLM staff from time-to-time on the Preserve (see CNLM 2021). Such activities are stopped as soon as possible by staff upon detection, but it is not feasible to detect all such incidents and some harm may already be done by the time the activity is detected. In general, the more public visiting the Preserve, the more likely and the more frequent these events.

Another risk to the Preserve occurs if the Preserve is opened without CNLM intent. One example is unanticipated access by first responders towards addressing a public safety (e.g., health or crime) event. Those events have been rare and the value of public safety weighs heavily in the decision. However, other such unanticipated openings of the Preserve gates have occurred that do not carry such value—an example being the City's opening the Preserve gates on two occasions in 2020, creating uncontrolled public access until CNLM staff discovered the situation and provided appropriate control.

4.2. Increasing use of the Preserve by the public

In 2011, and in part because of concern over cumulative and increasing impacts from public access, CNLM installed infrared trail counters at both gated entrances (Dana Strand and Scenic) to the Preserve's trail. The intent was to gather objective data on the amount of public visitation of the Preserve trail over time. Data were inspected for any issues that may have resulted from power failures or failures in triggering counts upon entry of the public. Data were then cleaned to remove any suspect entries, resulting in some data missing for certain months. All days with reliable data counts were included in the dataset for the year and average number of visitors per day (i.e., per day of data collection) was calculated. Data collection during 2018-2019 was affected by a high incidence of dead batteries, corrosion of the electronic plates, frayed wires, and installation errors. Thus, data were very incomplete and were considered unreliable as estimates of public use of the trail. Accordingly, a seven-year presentation of visitation is provided for the period 2011 through 2017 (Table1, Figure 4). For this representation, data from one gate only (Scenic gate) were used. Although this could lead to an over-representation of visitors (i.e., those who both entered and exited from the Scenic gate), that bias is reasonably assumed to be counter-balanced by the opposite—i.e., visitors exiting and entering from the other gate only. Further, the number of visitors recorded is probably an underestimate of the actual number because the counter counts people passing the sensor with a delay of 1.5 seconds rather than counting all individuals, and visitors not infrequently enter the gate in a group—and thus would be counted as only one visitor. To be clear, references in this document to “number of visitors” that were recorded on the Preserve is more accurately defined as “number of counts by the infrared trail counters”.

It is clear there is a significant upward trend over time in average daily visitation, almost doubling in that seven-year (2011-2017) period from 345 per day to 673. If these averages are represented as estimates of annual number of visitors (multiplying by 365 as the trail was open most days of the year for that period), that would indicate an increase in visitors from over 125,000 in 2011 to over 245,000 in 2017.

Table 1. Average daily trail use counts and 95% confidence intervals (CI) at the Dana Point Preserve, 2011-2017.

Year	**Average Daily Visitation**[1]					**Annual Visitation Estimate**[2]
	Mean	**SE**	**N**	**Lower 95%CI**	**Upper 95%CI**	
2011	344.5	10.3	185	324.3	364.7	125,740
2012	319.6	9.8	248	300.4	338.7	116,637
2013	361.1	8.5	344	344.3	377.8	131,793
2014	355.8	9.2	306	337.8	373.8	129,851
2015	444.6	16.0	239	413.3	475.9	162,281
2016	612.7	19.3	366	575.0	650.5	223,643
2017	672.5	20.4	302	632.6	712.4	245,465

[1] Average daily trail use counts, which represents average daily visitation, were calculated as the total counts per year / days of data collection

[2] Estimates of annual visitation were calculated as average daily trail use counts * 365 days.

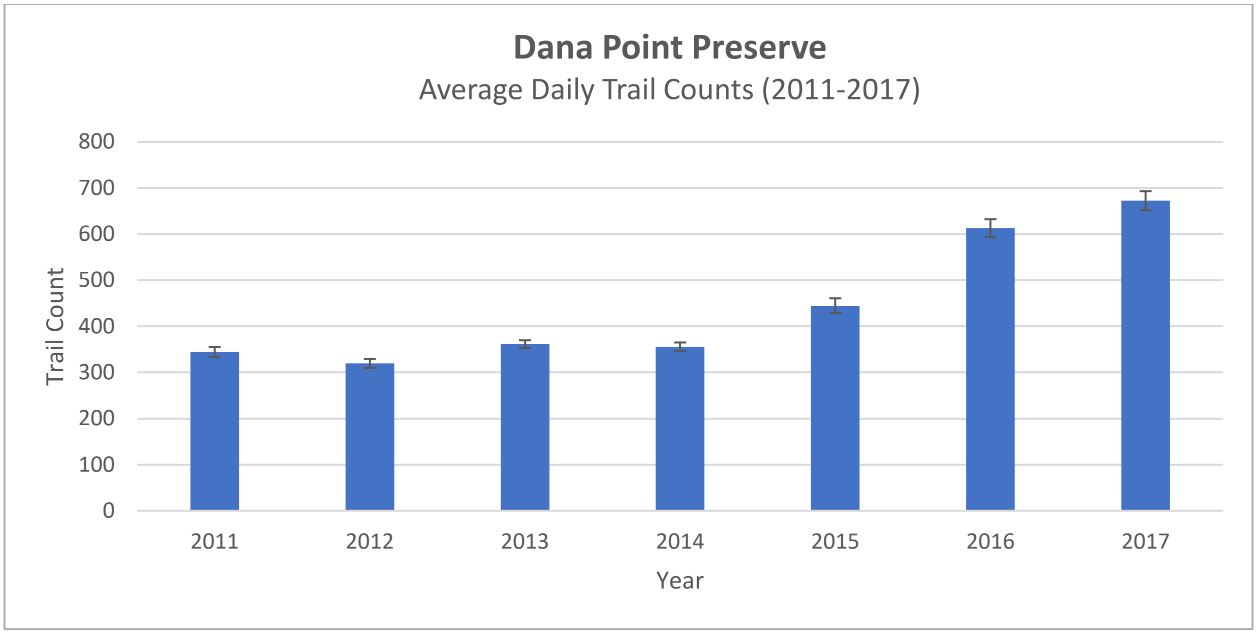

Figure 4. Average (Mean, Standard error) daily trail use counts (2011-2017) at the Dana Point Preserve.

The counters were reliably working towards the end of 2019. Data for January, February, and March 2020 (pre-COVID) showed an average of 713±62.0 (SE) visitors per day. This suggests that the upward trend represented in 2011-2017 had continued, with an ever-increasing daily average of visitors on the public trail and had potentially reached over ¼ million visitors per year. The trail was closed in mid-March 2020 to the public—initially for trail maintenance and then longer because of COVID-19.

The trail was re-opened gradually commencing in mid-October 2020—initially for two days per week, three hours per day. Public compliance with COVID-19 safety rules for the trial was monitored, as were COVID-19 statistics and public health directives, and, in response, the trail was temporarily closed mid-December 2020 to February 2021. By April 2021, the trail was opened for three days per week, and by mid-June 2021 it was open eight hours per day on those days. That schedule remained in effect through 2021 and to the present (April 2022). To determine whether visitation rates per day have been affected by the trail hours in 2021-2022, data collected between August 2021 and February 2022 were analyzed. The number of visitors per day, with the 2021-2022 trail hours schedule, was, on average, 503.8 (±29.7; 95% CI: 445.4-562.1). Extrapolating to annual visitation, based on three days per week, the estimate is 78,593. These data suggest that reducing the number of days per week that the trail is open to the public can effectively reduce the total number of visitors on a weekly and annual basis. Reducing the number of hours per day (to eight) also appears to have had a moderating effect in number of daily visitors. The average number of visitors was approximately 504 per day, somewhat higher than the average across 2011-2017 (444 per day), but much reduced from that in 2016 (613 per day), 2017 (673 per day), and the early 2020 observations of 713 per day. To summarize, based on experience in 2020-2022, reduction in number of days per week and hours per day that the trail is open to the public, resulted in a decrease in daily (and weekly and annual) number of visitors onsite.

The highest, and not just average, number of visitors per day could also be an important measure of impact on natural resources. Peak (one day) visitation can also be determined, although data are not available for every day that the Preserve's trail was open so the peak days for visitation (e.g., annually) can't be confidently stated. Further, as previously explained, because several people can enter a gate at one time and only be counted as one, and if there are many visitors in a short period of time this is more likely to happen, that suggests that on busy days, the counts are likely to be underestimates of actual visitors. The greatest number of counts recorded on a single day within the period 2011-2017 was 2,896 and occurred on December 26, 2016. The highest daily count for early 2020 (i.e., the Preserve was closed from mid-March until partially re-opened in October) was 2,175 (February 16, 2020). Peak visitation days may be related to certain holidays and weather, thus there is no direct comparison available between 2016 and 2020. The highest daily count for the period August 2021 through February 2022, when the three-day-per-week/8 hrs-per-day schedule was in place, was 1,537 (January 1, 2022). This suggests that reducing the number of hours per day may be effective in reducing the extremes in number of visitors per day, thereby potentially lowering impact on the Preserve's natural resources (if higher numbers of visitors per day is accompanied by greater impact than lower numbers).

4.3. Increased vulnerability of Pacific pocket mouse to extinction

The Pacific pocket mouse (PPM) has become rarer and hence more endangered since 2005. At the time the Plan was written, there were only four known populations. In fact, PPM were thought to be extinct beginning in the early 1970s until rediscovered in 1993 at what is now the Dana Point Preserve (Brylski 1993, USFWS 1994). Subsequent to its rediscovery, PPM was found in three additional locations on Marine Corps Base, Camp Pendleton (north San Mateo, south San Mateo and North Santa Margarita). However, PPM have not been documented in one of those three locations (North San Mateo) since 2003 (Natural Resource Assessment Inc. 2003, USFWS 2010). Therefore, it is suspected that this population has since been extirpated. As such, the species is now more vulnerable in having fewer well-established wild populations and the PPM population on Dana Point has become more important for the persistence of the species. Additionally, this site is the only non-federally owned property where the PPM occurs.

4.4. Results from monitoring the two listed species onsite

As a general assessment of onsite presence, the two listed species on the Preserve have been monitored to provide information on their presence and changes in presence over time. For the coastal California gnatcatcher, surveys have been conducted annually by CNLM staff following USFWS protocols and permitted by CNLM's 10(a)(1)(A) permits. In addition to indicating presence, the surveys were generally able to detect numbers of individuals and reproductive groupings (pairs). Baseline data for the Preserve's population of gnatcatchers, collected in 2006, suggest a modest presence of perhaps three pairs or family groups (Table 2). Between 2006 and 2018, that number fluctuated between three and seven pairs—such fluctuations not being surprising for this (sub)species and variations in habitat conditions. There was an increase in 2019 to 14 pairs detected, and an even stronger increase in 2020 of 20 pairs. The results for the 2021 monitoring events show a slight decline with 17 pairs detected, nine of which were successful at producing offspring (Table 2).

The visiting public potentially impact the gnatcatchers in various ways (see section 4.6), especially during breeding season. Although not all impacts are directly observable or would happen at such at time that would be noted by staff, there is at least one documented direct impact by the public. In 2018, one gnatcatcher nest was observed in a shrub immediately adjacent to the trail at Overlook 4. As a precaution to protect the nest, that small section of the trail was temporarily closed to public use (signs and temporary barriers were placed on both ends of the trail); however, visitors frequently ignored this closure and used that section of trail (CNLM 2019). Ultimately, that particular nest failed, and that pair did not produce a successful nest in 2018.

Table 2. Monitoring results for coastal California gnatcatcher on the Preserve 2006-2021.

Reporting Year	Survey Results
2006	3 family groups
2007	3 pairs; 1 nest produced 3 fledglings
2008	4 pairs; All pairs produced 3-4 fledglings each
2009	5 pairs; All pairs produced 3-4 fledglings each
2010	4 pairs; All pairs produced at least 1 fledgling each
2011	5 pairs; 4 pairs produced at least 1 fledgling each
2012	7 pairs; All pairs produced at least 1 fledgling each
2013	7 pairs; 6 pairs produced at least 2 fledgling ea.
2014	6 pair; 3 pairs produced at least 1 fledgling each
2015	5 pairs; 3 pairs produced at least 1 fledgling each
2016	6 pairs (min)
2017	5 pairs (min)
2018	7 pairs (min), one nest likely failed due to proximity to trail.
2019	14 pairs; at least 8 pairs successful. Multiple pairs attempted second nest.
2020	20 pairs; at least 9 pairs successful. Multiple pairs attempted second nest.
2021	17 pairs; at least 4 pairs successful. Multiple pairs attempted second nest.

For Pacific pocket mouse, detection is more challenging and less precise, given that they are nocturnal, dwell in underground burrows, and surface only for certain essential activities including foraging, mating, and dirt baths. Live-trapping has been conducted from time-to-time on the Preserve and this provides confirmation of the presence of the (sub)species and can provide some other indicators of population health (such as presence of both sexes, reproductive status, general health of individuals trapped).

Other reasons for trapping have been to provide individuals for the USFWS's captive breeding program and to allow for collection of samples for genetic testing. Fecal samples have sometimes been collected with the objective of analyzing for diet composition. The number of animals trapped has an uncertain and perhaps changing relationship to the actual number of mice on the Preserve, but it's reasonable to assume that it is a general indicator of high, medium, or low numbers overall on the Preserve.

Preserve staff have kept live-trapping at a minimum given its highly invasive nature. Stress to the trapped animals is inevitable and accidental deaths are possible. Live-trapping has been conducted in six years since 2008, commencing the year prior to the trail opening (2008) and again in May 2009—with the trail being opened to the public later in the year (Table 3). That year, there were 82 animals (unique individuals) trapped—up from 30 trapped the year prior. From that point on, the number of trapped individuals decreased dramatically over the three trapping events from 2012 to 2019, with only two animals trapped in 2019. Trapping was most recently conducted in summer 2020, coincidentally after the Preserve had been closed for over three months due to COVID-19. Although only two years had elapsed since the previous trapping events, the trapped number of individuals was dramatically higher: 77.

Although trapping success can also be associated with trapping "effort" (measured here as trap availability—e.g., one trap deployed for one night = one trap night), similar trapping efforts (e.g., 2009 vs 2012) resulted in very different numbers of mice caught, and high levels of trapping effort (e.g., >1200 trap nights) provided results that varied from 82 to 6 (Table 3). Although the trapping effort in 2019 was low relative to that in 2017, even tripling the outcome (i.e., as a rough estimate of effect of increasing the trapping effort to something similar to 2017) would have still resulted in a low number of mice trapped (hypothetically). The trapping effort in 2020 was lower than that in all the previous years but one since 2008, yet had the second highest number of mice trapped. Generally, vegetation management occurred over the entire period but there was a focus on vegetation management (i.e., removal of dead plant material) in 2020. In general, a high level of trapping will not result in significantly more captures if there is a low resident population; conversely, even a lower trapping effort can result in high trapping results if there is a robust resident population of mice.

Table 3. Results from all live-trap PPM monitoring events 2008-2020

Year of Trapping Events	**Level of Effort (trap nights)**	**Trapping Results (unique PPM)**
2008	3280	30
2009 (May)	3770	82
2009 (December) Trail opens to public		
2012	3330	57
2017	2286	6
2019	792	2
2020 (March 11) Trail closed to public		
2020	1254	77

Many variables and conditions can affect both the number of Pacific pocket mice onsite and the number of trapped individuals including, but not limited to, food supply, vegetative cover and composition, sex ratio, demographics, and influences on above- and below-ground behavior. The latter could include the influence of the visiting public. For example, data collected in 2020 indicated a significant correlation between vegetation management (in this case, removal of some dead vegetation, primarily shrubs) and location of PPM (Brehme et al. 2020). It is acknowledged that it is not feasible to have an experimental design that allows changes in PPM (or other species) to be attributed to any single factor—there are many moving parts in a natural landscape, as well as lag effects for some treatments or influences that may complicate the observed patterns.

Starting in 2011, CNLM used track tubes to monitor PPM using methods developed by experts in the field and following USFWS survey protocols. Prior to 2011, monitoring efforts only utilized live traps. The latter involves causing stress to the animals and potential harm from the trap itself or from subsequent handling. Since 2011, track-tube monitoring has been conducted, typically annually, supplementing occasionally with live-trapping when other kinds of data are needed.

Track-tube surveys have been used successfully for monitoring PPM (Brehme et al. 2014), providing information on presence/absence, areas occupied, and—depending on survey design—some phenological and demographic data. This information is valuable in guiding short-term management decisions, helping to reduce the risk of harassment or take of PPM, and determining any trends that may be important for the long-term management of the Preserve. Such surveys may also be an indirect indicator of habitat suitability for PPM.

While track-tube monitoring can provide important data on presence and area occupied within the Preserve, there is not necessarily any direct correlation with PPM abundance. As such, and because of the differences in track-tube monitoring effort and survey design over the years, live-trap data have been presented in this plan as a reference for changes in potential population size.

4.5. Increasing and new threats

COVID-19 was not the only significant viral attack in 2020. Also that year, rabbit hemorrhagic disease virus serotype 2 (RHDV2)—a fatal disease in rabbits—was documented in San Diego, Orange, and several other counties in California. This virus can be vectored on shoes and clothing of the visiting public. Infections on the Preserve or its vicinity would not only almost certainly result in the death of the rabbits but have further consequences for the ecosystem. But RHDV2 is just one example of viruses or other causes of extreme disease that will occur from time to time and public access can exacerbate the risks and consequences.

Snake fungal disease (*Ophidiomyces ophidiicola;* SFD) was also recently (2019) confirmed in California (CDFW 2019). SFD affects many snake species and presents a threat to the eight species of snakes found on the Preserve. Cases of SFD can be moderate to fatal. SFD lives in soil and can be transmitted to snakes by direct contact with infected animals or a contaminated environment; spread of the fungus to new locations may occur when people track contaminated soil embedded in clothing or shoes (Cornell University 2019).

Climate change is a continuing and expanding influence with uncertain impacts on the Preserve's natural resources. Across southern California, the average annual minimum and maximum temperature increased during the span of 1918-2006, +0.17 °C and +0.07 °C per decade respectively (EcoAdapt 2016). While increased annual temperatures will have impacts to the Preserve, it is likely that changes in annual seasonal variability will have a higher impact on the Preserve. Changes in maximum annual temperatures, rather than increased annual temperatures, have been shown to be correlated with local extinction events (Roman-Palacios and Wiens 2020). Since 2005, we certainly have experienced some drought effects. The longer-term influences of rapid climate change on weather patterns influencing the Preserve have some uncertainty. Nevertheless, any significant changes from historic patterns will undoubtedly have consequences for the plants and animals onsite. Changes in processes such as nitrogen deposition, decomposition, pollination, and soil water recharge could also have onsite consequences. These changing conditions can be stressors on plant and animal life, and consequences could include depressing effects on the food supply and habitat conditions for the Pacific pocket mouse and gnatcatcher, for example.

The Argentine ant (*Linepithema humile*, Mayr), a non-native invasive ant species, is considered a threat to many native terrestrial species in California and is listed as a global species of concern (ISSG 2021). In California, Argentine ants are more likely to be in high abundance along the coast than inland areas and in urban and agricultural areas more so than large natural open spaces (Mitrovich et al. 2010, Richmond et al. 2021). It is not surprising that, being coastal and urban, Argentine ants are present throughout the Preserve (CNLM 2019). While it is unknown when the Argentine was established in the Preserve, the infestation does appear to be at higher density than when the first CNLM Argentine ant survey was conducted in 2014. At that time, the Argentine ant naïve occupancy estimate was 65.6% (82/125 grids) while in 2018 the naïve occupancy estimate was 94.6 % (123/130) with more grids (87/130) having a "high number" of Argentine ants present on bait (i.e., >250 individuals) than in 2014 (32/125) (see CNLM 2014 and 2019).

The impact of Argentine ants on the arthropod community has been widely studied in agriculture and in urban and natural settings. Research has shown a negative relationship between Argentine ant presence and diversity of arthropods including native ant species and pollinators in their introduced range (e.g., Lach 2007, Naughton et al. 2020, Richmond et al. 2021)—both of which can impact pollination success (Rankin et al. 2018), seed set, seed dispersion, and germination success of plant species (Carney et al. 2003, Lach 2007). In addition, research has shown negative impacts of Argentine ant infestations on reptile and avian species (e.g., Suarez et al. 2005, Alvarez-Blanco et al. 2020). Within the Preserve, Argentine ants have been documented in failed gnatcatcher nests (K. Merrill pers. comm.). Direct impacts to mammals are less known. However, during PPM trapping events at Camp Pendleton Argentine ants were found in traps with and on PPM (and other small mammal species) (Brehme et al. 2014). Argentine ants are tramp species, likely drawn to the trap for the seed bait and can quickly monopolize resources including small vertebrates such as PPM, targeting their vulnerable areas (i.e., nose, mouth, ears and eyes). Argentine ants were also noted scavenging on two dead PPM, which were casualties associated with a live trapping event in 2020 (K. Merrill pers. comm.). While it is uncertain if the ants were the direct reason for the deaths, the negative impacts of Argentine ants on ecosystem health are known (e.g., Carney et al. 2003, Lach 2007, Rankin et al. 2018). As a result, the threat of Argentine ants has been highlighted in recovery plans for threatened or endangered species, including PPM (USFWS 1998). It is possible that Argentine ants directly impact PPM through predation in their burrows (Brehme et al. 2019) foraging on young and indirectly through harvesting seed caches. Trash left by visitors (i.e., food and beverages) exacerbates the threat by providing additional resources (sugary drinks in particular) to Argentine ants along the trail, in the adjacent parking lot, and within PPM habitat (K. Merrill pers. comm.)

Ongoing and increasing residential development in the vicinity of the Dana Point Preserve has the potential to increase indirect threats to sensitive species on the Preserve. Such threats may include an increase in the number of domestic cats and other non-native and native predators generally associated with human development (crows, ravens, raccoons, red fox), as well as negative impacts from vibrations, noise, and artificial lighting (USFWS 1998, 2010, Brehme et al. 2013-2020, D. Shier pers. comm.) and recreation (USFWS 1998).

4.6. Public impacts from trail use: scientific research

4.6.1 Introduction

A growing base of scientific literature provides evidence (and supports scientific principles) concerning the negative impacts of public access—even that type of public use that may have been described as “passive recreation” in 2005 when the Preserve was first protected. Negative effects related to recreational disturbance have been documented across a wide variety of species and taxa including, mammals, birds, reptiles, amphibians, and even invertebrates (e.g., Steven et al. 2011, Bennett et al. 2013, Larson et al. 2019). And more recently, the COVID-19 pandemic, with its associated closures of many public parks and preserves, provided an unprecedented experimental frame in which to evaluate wildlife and other natural resource responses to exclusion of the public for some time. (The authors acknowledge that the opportunity provided to scientists by COVID-19 closures of natural areas was and remains a tragic occurrence.) One collection of these pandemic-related research activities was prefaced by the statement that "an increasing body of evidence is emerging that indicates non-consumptive recreational activities like hiking, which [doesn't] involve harvesting of resources, can have harmful effects on species, their habitat, and efforts to protect them" (Unger 2020).

The increasing awareness of potential effects of recreation on wildlife has not only led to a proliferation of research but further prompted reviews and syntheses of these studies (e.g., Larson et al. 2016, Larson et al. 2019, Miller et al. 2020, Dertien et al. 2021). Larson et al. (2016) reviewed 274 scientific articles that were global in geographic scope and included a broad range of taxonomic groups. The objective of that review was to identify knowledge gaps and assess evidence for effects of recreation. In that review, it was found that 93% of published studies documented at least one effect of recreation on animal species and most of those effects were negative (Figure 5). Given that the definition of "positive" interactions included increased biodiversity (which would also include non-native species) and habituation (which is often at a cost to the species, even if present, and may cause ecosystem-level issues), the percentage of negative impacts was probably under-represented.

In 2019, Larson et al. conducted a meta-analysis of recreation effects on vertebrate species richness and abundance. In this analysis, they parse recreation by terrestrial and aquatic and wildlife by carnivores, herbivores, and omnivores, as well as by taxa (Larson et al. 2019). Another review by Miller et al. (2020) investigated the effects of recreation in the context of public lands and recreation management. They categorized recreational activity into five types based on the use/non-use of motorized equipment, season, and location (terrestrial vs. aquatic) and within these categories, synthesized existing research for each of six taxonomic groupings of species. The authors' objectives were to provide a reference for public land planners and managers, describe management principles, and outline priority research and administrative study areas towards better understanding recreation-wildlife interactions and minimizing negative effects on wildlife while maximizing the benefits gained by recreationists. Another review by Dertien et al. (2020), which included 38 years of effect of non-consumptive recreation on wildlife, identified and quantified “effect thresholds”, or the point at which recreation begins to exhibit behavioral or physiological change to wildlife. These authors provide quantitative guidelines for various wildlife groupings (wading birds, raptors, songbirds, ungulates, rodents, etc.) that can be used by planners and natural resource managers for the design of recreation infrastructure and management of recreation activities.

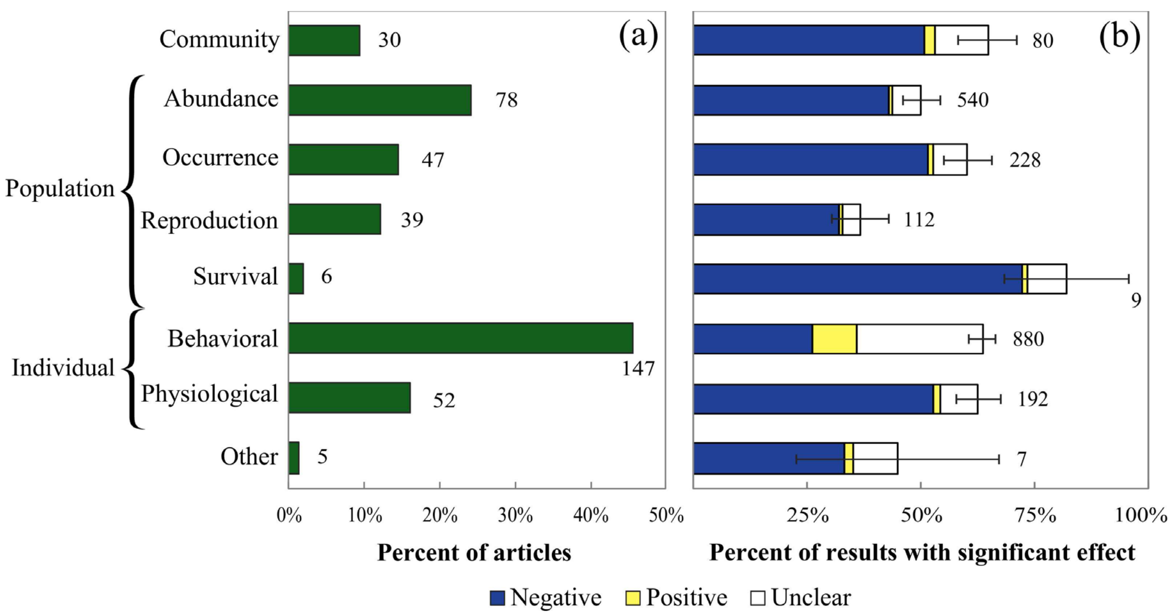

Figure 5. Types of animal responses to recreation from article review (excerpt from Larson et al. 2016). Response types are categorized into community-, population-, and individual-level responses. Panel a) shows the percent of articles in which each response type is tested (numbers of articles follow the bars). Panel b) shows the percent of results in which a statistically significant effect of recreation on an animal species was observed (number of results follow the bars). Total percentages are divided into negative, positive, and unclear effects of recreation. Error bars show standard error for the sum of all effects.

For the purpose of this update, the literature was queried for studies related to public trails and/or recreation and related impacts, if any, on natural resources. Dozens of studies were reviewed and are further described (taxa, location, objectives, results) in

Appendix A. This is not a comprehensive list but a sample of literature pertaining to public access, anthropogenic disturbance, and the effects on natural resources of public use. Most, but not all, studies reviewed reported negative effects from public use of trails. However, the majority of studies did report negative effects—see, for example, the meta-analysis by Larson et al. 2016. For studies that reported any positive effects, those were frequently because habituation and/or increases in biodiversity (even if non-native species were included) were considered positive, or because public visitation was tied to financial support for the conservation area and suffered if tourism was reduced.

In general, damaging effects on animals resulting from recreation activities include reduced reproductive success (Beale and Monaghan 2005), declines in abundance and occurrence (Reed and Merenlender 2008), modified habitat use (George and Crooks 2006), and altered species richness and community composition (Kangas et al. 2010). Disturbance from recreation may have both immediate and long-term effects on wildlife. The immediate response of many animals to disturbance includes physiological stress, change in behavior (interruption of foraging, fleeing), or altering reproductive behavior (Persons and Eason 2017, Gutzwiller et al.1994, Arlettaz et al. 2007). Over time, energetic losses from flight, decreased foraging time, or increased stress levels come at the cost of energy resources needed for individuals' survival, growth, and reproduction. The cumulative, compounding adverse effects of predator-avoidance behaviors can have impacts on fecundity and every component of offspring survival, with long-term implications for population growth (Allen et al. 2021).

Human disturbance on wildlife from non-consumptive recreation can result in altered spatiotemporal habitat use (Kangas et al. 2010), extirpate wildlife from otherwise suitable habitat, or cause animals to shift geographically into areas of lower quality habitat to avoid areas with human activity (Taylor and Knight 2003, Ficetola et al. 2007, Finney et al. 2005, Kangas et al. 2010, Mallord et al. 2007, Dertien et al. 2021). Thus, recreational disturbances can both reduce habitat suitability and ultimately result in functional habitat loss (Gutzwiller et al. 1994, Frid and Dill 2002, Tost et al. 2020).

Fragmented habitats may present unique stressors if there is no adjacent habitat for animals to relocate to, forcing individuals to remail in proximity to disturbance that they would otherwise avoid (Frid and Dill 2002).

There is much complexity in studying, and then understanding, the interaction between recreational activities and wildlife response. Conceptual frameworks can assist in structuring such complexity and informing experimental designs. One such framework identifies three important factors or “modulators” in these interactions: wildlife, human, and context (Figure 6, Tablado and Jenni 2017). The framework represents increasing levels of complexity in the mechanisms for wildlife response—from sensory detection; to short-term behavioral changes and physiological responses; to changes in survival, production, spatial use of the habitat, and chronic stress; and finally, changes in population trends and distribution. These levels of complexity also mirror the level at which the effect is occurring: from individual- to population-level, and the latter then also affecting species-level condition. In a review of global literature on wildlife-recreational interactions, many of the articles reviewed reported impacts at both the individual- and population-level, and of the former, the most often noted were behavioral impacts (Larson et al. 2016, Figure 6).

At the individual level, wildlife-recreational interactions can elicit responses that are generally categorized as behavioral or physiological. Behavioral interactions can be both short term and longer term and can be innate (perhaps genetic) or learned, or a combination. Examples of short-term and longer-term behavioral responses have been provided in a recent literature review and analysis of such interactions (Table 4, Miller et al. 2020). The responses are highly variable (from attraction to avoidance, and from habituation to sensitization)—thus emphasizing the complexity of these interactions and their dependence on the specific human, wildlife, and context “modulating factors”.

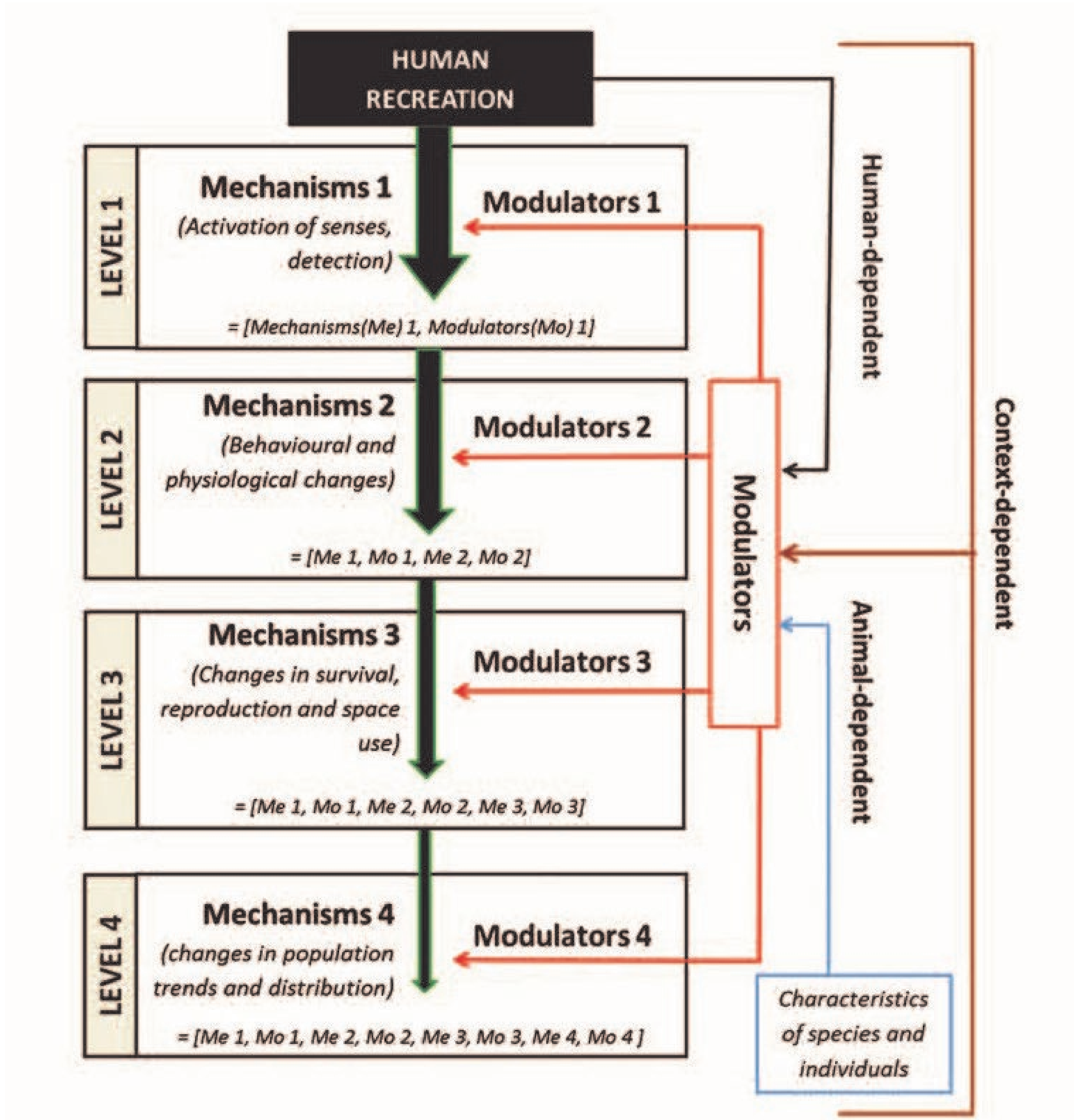

Figure 6. Conceptual framework showing different levels in the processes of human-wildlife interactions (excerpt from Tablado and Jenni 2017).

Table 4. Short-term and long-term learned behavioral responses of wildlife to human activity (excerpt from Miller et al. 2020).

Behavioral response	Definition	Example	Source
Short-term responses:			
Attraction	The strengthening of an animal's behavior because of rewards or positive reinforcement.	A chipmunk is attracted to areas where recreationists leave food.	Knight and Gutzwiller 1995
Avoidance	The strengthening of an animal's behavior because of persecution or negative reinforcement.	Grizzly bears in an area with high human activity levels often flee from people, while those in an area with no or little human activity do not.	Knight and Gutzwiller 1995
Tolerance	Intensity of disturbance that an individual tolerates without responding in a defined way.	Terns ignore heavy vehicle and boat traffic. This is measured in the short term, and evidence of this tolerance increasing over time is absent.	Nisbet 2000
Long-term responses:			
Habituation	Waning of a response to a repeated stimulus that is not associated with either a positive or negative reward.	Birds habituate to stimuli that are predictable and nonthreatening, such as road traffic, but are startled by sudden and unpredictable noises such as gun shots.	Eibl-Eibesfeldt 1970
Sensitization	Increased behavioral responsiveness over time when animals learn that a repeated or ongoing stimulus has significant consequences for the animal.	Avoidance of noise or other stimuli associated with danger; entails an increased energy expenditure to avoid danger.	Richardson et al. 1995

Another variable that may be useful in an experimental framework to study wildlife-recreational interactions is distance from the source of the potential disturbance. The source could be a trail, for example, and potential impacts measured for a variety of species at varying distances from the trail (assuming the trail is regularly used for recreation). Reasonably, the effects may be related to the spatial scale at which various species occupy and use the area, and perhaps also may be seasonally dependent (e.g., populations may be more or less sensitive during certain stages of a life-cycle). Although no specific information on this topic is available for Pacific pocket mouse, three "distance zones" were superimposed on the Preserve to provide a sense of how this concept might be experienced. Three zones—13, 50, and 100 meters from the trail—were mapped (Figure 7). Given the meandering nature of the trail, even the shortest (potential) impact zone (13 meters) covers a significant portion of the Preserve (16%). That distance was selected on the basis that this may be the average diameter for PPM core home range (Shier 2009). The other two distance zones, 50 and 100 meters, reflects some literature that found that smaller rodent species avoided areas within 50-100 meters of trails or people (Dertien et al. 2021). At 100 meters, almost 90% of the Preserve is included in the potential impact zone.

In the following sections, there is continued discussion of the relevant literature, beginning with a description of the ecology of the Pacific pocket mouse so as to better allow connections to be made with potential influences or threats to this subspecies. Following that, the literature has been categorized by general taxonomic groups: vertebrates, invertebrates, and habitat and vegetation communities. Given the likelihood that dogs would be perceived as a threat to PPM and that they are occasionally brought onto the Preserve by visitors, some literature is presented that examines wildlife responses to domestic dogs. Finally, the topic of habituation is explored, given that it is a potential modulator in the response of wildlife to public recreation on the Preserve.

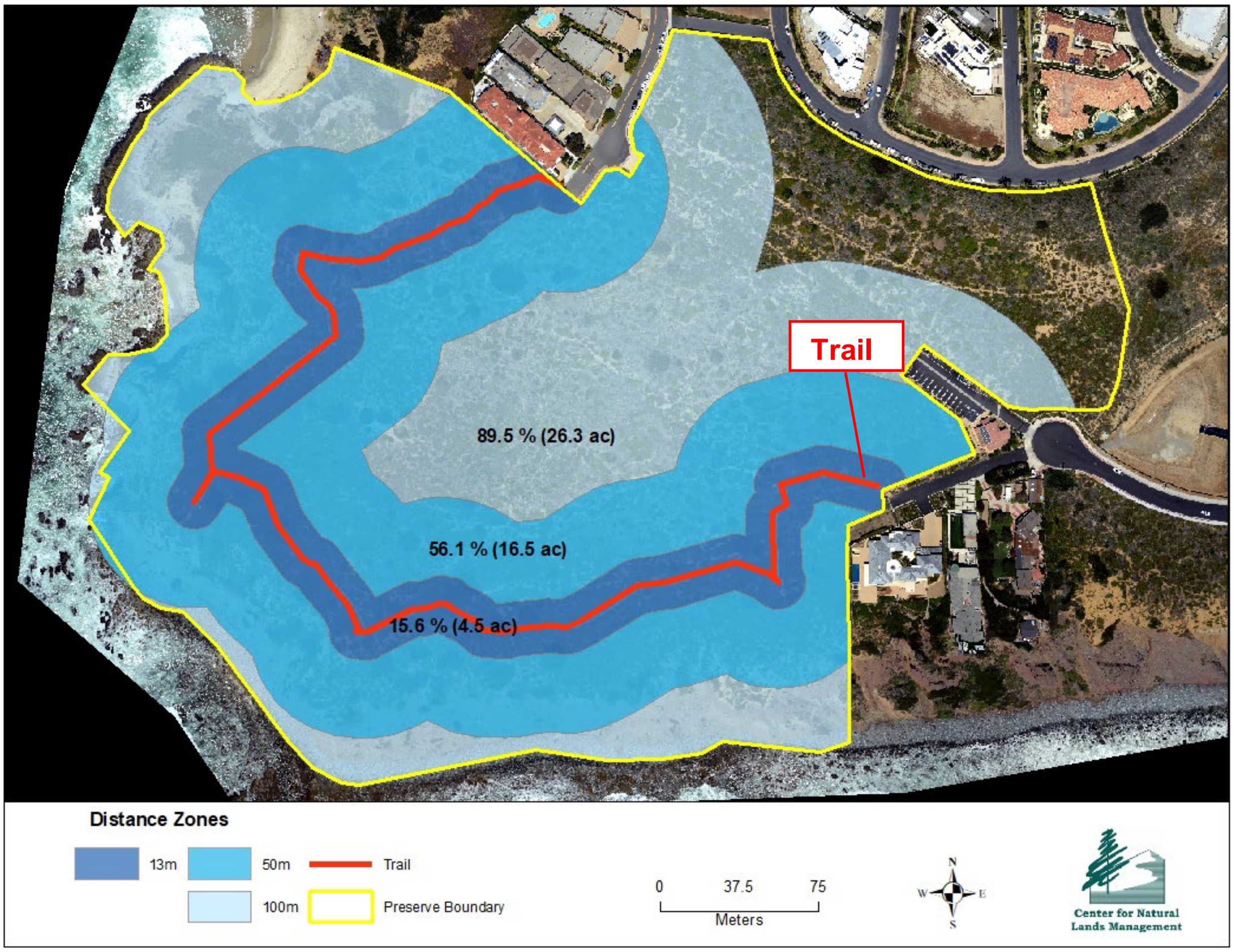

Figure 7. Zones of varying distance (13m, 50m, 100m) from the trail at the Dana Point Preserve. Values show proportion (%) and area (acres) of the Preserve covered by each zone.

4.6.2. PPM ecology and impacts from human disturbance

The Pacific pocket mouse is a nocturnal, aggressively solitary, and semi-fossorial rodent in the family Heteromyidae that is physiologically adapted to warm and dry climates (USFWS 1998). It is the smallest subspecies of the little pocket mouse (*Perognathus longimembris*), generally ranging between 7–9 grams in adult body mass (USFWS 1998). Adults weighing as little as 5 g and as much as 12 g have been trapped on the Dana Point Preserve (K Merrill pers. comm.). Average life expectancy in the wild is approximately 1 year, with survival for as long as 3–5 years not uncommon (French et al. 1967, 1974). This short life expectancy contributes to the population's vulnerability:

significant impacts to even one reproductive cycle could have serious consequences for the sustainability of the population.

The onset of breeding is typically in early spring and lasts through July (USFWS 1998). The time period during which a female PPM is in peak estrus can be extremely limited (i.e., as brief as one hour per cycle, D. Shier pers. comm.). Disturbance during this time could dissuade reproductive behavior. Females gestate young for approximately three weeks and wean after 30 days.

Reproduction is also influenced by food availability. In fact, reproduction may not occur in years of low food resources (Brehme et al. 2019) but in high resource years, adult females in the wild may have up to two litters with their female offspring mating and reproducing in a single season (Miller and Pavelka 2008). PPM is largely granivorous, specializing on grass and forb seeds (USFWS 1998). A positive relationship was found between forb cover and PPM occupancy at Marine Corps Base Camp Pendleton (MCBCP; Brehme et al 2014) and at the Preserve (Brehme et al 2020). Genetic analysis of PPM scat has shown that diet varies across populations and that within one season, regardless of available seed resources from shrubs and grasses, they tend to select a wide variety of forb species (Iwanowicz et al. 2016). Years with low forb growth and early forb die-offs have been associated with PPM declines (Brehme et al. 2019). Food availability is thus related to successful production of grass and forb seeds (for the most part) on site—which is, in part, weather-related. Considerable research has tied reproduction in heteromyids and other desert rodents to precipitation (Reichman and Van De Graaff 1975, Kenagy 1973, Kenagy and Bartholomew 1985, Beatley 1969). But food availability can also be influenced by competition from other species for the same food resources, loss of food sources from insects and disease, and destruction of plants from trampling or picking.

PPM create and live in burrows beneath the soil surface, and cache seeds below ground and within burrow systems for sustenance throughout the year (e.g., Randall 1993). More recent research has provided evidence that both pit caches and larders may be used (Chock et al 2019). In sand dunes in Oceanside, CA, burrows were found approximately one foot below the surface under vegetation edges and ended in a single nest chamber (Bailey 1939). Burrows and tunnels can sometimes be even closer to the surface—as little as 1 to 4 inches below ground (D. Shier pers. comm.). As such, sounds and vibrations from above-ground disturbances such as trail users, could affect PPM below ground. In sandy habitats, burrows are particularly vulnerable to compaction by foot traffic. Brehme et al (2014) reported a strong negative effect of human foot traffic on PPM occupancy. Although much remains to be studied regarding burrow architecture, recent observations have indicated that the height of the burrows may be very shallow (e.g., 1 inch)—further indicating their vulnerability to collapse.

Pacific pocket mice, while remaining below-ground for substantial amounts of time, of course need to conduct life-sustaining activities at the surface including feeding and food collection, selecting mates and mating, territory exploration and expansion, and bathing (i.e., dust baths). The average PPM core home range size is estimated to be 0.017 ha, or ~13m in diameter (Shier 2009) but individuals have been recorded traveling 181 m in a single night, with average movement distances reported of 10 m to 30 m between successive captures (Dodd et al. 1998, 1999, Miller and Pavelka 2008). Mark-and-release studies indicate limited adult movement and juvenile dispersal distances (Swei et al. 2003).

Those activities are typically conducted at night or during low-light levels. As such, artificial night-time lighting may cause problems for nocturnal rodents such as the Pacific pocket mouse, through potential modification of predation rates, obscuring of lunar cycles, and/or causing direct habitat avoidance (USFWS 1998, Shier et al. 2020). A study of the effect of different levels and orientation of (artificial) night lighting on PPM at Marine Corps Base Camp Pendleton indicated that anthropogenic light negatively affected foraging of PPM (Wang and Shier 2017). As such, it reasonably follows that disturbances during low-light levels of the day (towards sunset or for some time after sunrise, and as influenced by fog or cloud cover) can shorten or discourage such essential activities.

PPM use seasonal heterothermy (winter torpor and facultative summer aestivation) in response to environmental stresses of food shortage and/or low temperatures (Chew et al. 1965; Bartholomew and Cade 1957). The onset of torpor is marked by a large drop-off in activity that can occur from June to November and is highly spatially variable within and among years (Meserve 1976a; Shier 2009; Brehme et al. 2014, 2020). During torpor, the mice alternate between periods of dormancy and feeding on cached seeds. Periods of dormancy have neither a daily nor strictly seasonal pattern (Brehme et al. 2014). In captivity, dormant individuals may show some activity each day within their burrows. Emergence typically occurs in late winter to early spring (February-March) and is thought to coincide with seed availability (Meserve 1976b). It has been suggested that the trigger for emergence may be changes in soil temperature (French 1977).

As the beneficial aspect of torpor or aestivation is to reduce energy expenditure, any disturbance that disrupts these states can have a negative effect. Again, such disturbances could include human-caused sounds or vibrations—especially if burrows are shallow and/or close to the surface. Further, because Heteromyids have expanded middle ears, they are especially sensitive to low frequency sound (D. Shier pers. comm.).

4.6.3. Impacts on vertebrates

Across many vertebrate species, species richness and abundance are lower in association with higher levels of recreation, and the negatives effects of recreation appear to be most pronounced for birds and mammals (Larson et al. 2019). Research on impacts to reptiles and amphibians are less represented but the majority of existing studies have found effects are negative (Miller et al. 2020). Even quiet recreation such as walking and wildlife viewing can have significant negative impacts on vertebrate wildlife (Papouchis et al. 2001, Arlettaz et al. 2007, Reed and Merenlender 2008, Hennings 2017), such as increased time spent in flight and vigilance behaviors (Naylor

et al. 2009). Disturbance increases with intensity (a combination of people per day, noise level, and speed) of recreational activity, and is greater in response to less predictable activities (Shutt et al. 2014, Miller et al. 2020).

Indirect effects of increased human presence can occur when humans create an environment of higher predator pressure or cause animals to temporally shift their activities to avoid human activity. In an urban park, white-footed mice (*Peromyscus leucopus*)—primarily a crepuscular-nocturnal forager—spent less time foraging in areas of high human use even though people were not allowed in this park after dusk, possibly due to increased predator presence along trails (Persons and Eason 2017). Temporal shift to avoid human activity can cause some species to become more nocturnal; such “diel shifts” can bring predator-prey species into greater overlap, with increase predation risks (Patton et al. 2019), or lead to suboptimal foraging (Wheat and Wilmers 2016)

Artificial illumination (artificial light at night; ALAN) is an increasing form of human-caused disturbance that can affect vertebrate behavior and ecology. Small prey species may be particularly susceptible to ALAN as it makes them more conspicuous and thus more vulnerable to predation by visual predators. A study by Shier et al. (2020) examined impacts of ALAN on foraging decisions of the endangered Stephen’s kangaroo rat (SKR, *Dipodomys stephensi*). ALAN decreased the probability of resource patch depletion compared to controls, indicating that ALAN reduced habitat suitability for this at-risk nocturnal rodent.

The presence of recreational trails in natural areas can limit the abundance or density of some bird communities (e.g., Bötsch et al. 2017), particularly of those species which nest or forage on the ground (Thompson 2015). For birds, impacts associated with trails may be due to interference with breeding behavior (Gutzwiller et al.1994), a reduction in foraging time (Frid and Dill 2002), alteration to vegetation structure near trails (Fernández-Juricic et al. 2001), the introduction of invasive species (Loss and Blair 2011), or increased presence of nest predators (Miller and Hobbs 2000). A review by

Steven et al. (2011) that included 69 research papers on the effects on birds of non-motorized recreation, found that 88% of these studies reported negative effects, including impacts to physiology, behavior, abundance, and reproduction.

Increased anthropogenic noise can interfere with avian acoustic communication (Slabbekoorn and Ripmeester 2008, Barber et al. 2010). Impaired communication resulting from anthropogenic noise has been linked to altered predator avoidance behaviors (Anze and Koper 2018), lower lek attendance in greater sage-grouse (*Centrocercus urophasianus*) (Blickley et al. 2012), reduced pairing success in ovenbirds (*Seiurus aurocapilla*) (Habib et al. 2007), and impaired nestling development in house sparrows (*Passer domesticus*) (Schroeder et al. 2012), indicating that the impacts of noise on communication have the potential to interfere with reproductive processes. Anthropogenic noise may function as a deceptive signal to wildlife, causing animals to engage in false responses that may be energetically and biologically costly. Evidence of this is provided by a study of endangered SKR, in which traffic noise not only masked but also mimicked foot-drumming signals (Shier et al. 2012). For vulnerable species such as SKR, the combined effects of communication disruption and signal deception may further tax already endangered populations.

4.6.4. Impacts on invertebrates

Predator-avoidance responses are not limited to vertebrates. Endangered Karner blue butterflies (*Lycaeides melissa samuelis*) were found to be sensitive to recreational disturbance and responded to recreationists as they would from natural threats, such as predators (Bennett et al. 2013). Through simulations these authors determined that regular disturbance could reduce egg laying potential and significantly restrict host plant choice, which in turn, could impact the butterfly's population dynamics. Invertebrates including butterflies, ground beetles, and spiders can also be affected by changes in vegetative structure (Blair and Launer 1997, reviewed in Miller et al. 2020). Butterfly species richness and diversity were lower in recreational areas as compared with biological reserves where recreation was prohibited (Blair and Launer 1997). Other

general anthropogenic impacts to insect populations can result from light pollution. ALAN strongly reduced moth caterpillar abundance compared with unlit sites, affected caterpillar development, and disrupted the feeding behavior of nocturnal caterpillars (Boyes et al. 2021).

4.6.5. Impacts on habitat and vegetation communities

Recreation can impact wildlife habitat by altering soil characteristics, water quality, and vegetative communities (Cole 1995, Barros and Pickering 2017, reviewed in Miller et al. 2020). Direct impacts to habitat and vegetation from trail use include through a loss of vegetative cover (Cole 1995, Barros and Pickering 2017), a decrease in vegetation biomass, or damage to tree and shrub seedlings (Sun and Liddle 1993). Recreational trails can function as corridors that facilitate the spread of non-native plant species into wildlands (Underwood et al. 2004, Wells et al. 2012, Liedtke et al. 2020). Trailheads, in particular, have been found to harbor high diversity and abundance of non-native plants within the seedbank and may function as a source point for invasions into protected areas (Wells et al. 2012). Additional indirect effects of recreation on vegetation community can occur when humans facilitate the spread of pathogens. The exotic pathogen, *Phytophthora ramorum*, for example, which is the cause of Sudden Oak Death, is likely spread by humans both within already infected areas and to novel locations (Cushman and Meentemeyer 2008).

4.6.6. Impacts of domestic dogs

The presence of pets and companion animals in open space and other protected areas may also cause direct and indirect impacts to wildlife species (Reilly et al. 2017). The effects of domestic dogs (*Canis lupus familiaris*) on wildlife have been reviewed extensively and disturbances to wildlife from domestic dogs and dog-walking are well documented (Banks and Bryant 2007, Steven et al. 2011, Hennings 2016, Reilly et al. 2017). Dogs are a domesticated subspecies of wolf and their presence and scent

(which remains after dogs are gone) repels many wildlife species and incites antipredator responses (Epple et al. 1993).

A review by Hennings (2016, 2017) on the effects of dogs concludes that (1) people with dogs on leash, and even moreso off-leash, are more alarming and detrimental to wildlife than any non-motorized recreational user group without dogs and that (2) people with dogs substantially increase the amount of wildlife habitat affected. The effects of dogs may be long-lasting and linger after the dog is gone, because the scent of dogs repels wildlife (Epple et al. 1993). It may be, too, that wildlife do not habituate to dogs (particularly off-leash dogs) because wildlife perceive dogs as predators, and because their behavior can be unpredictable (Banks and Bryant 2007, Weston and Stankowich 2014, Hennings 2016, Gomez-Serrano 2021).

People with dogs may represent the highest disturbance type of recreation for birds (Miller et al. 2020, Gomez-Serrano 2021). Dog walking in woodlands lead to a 35% reduction in bird diversity and 41% reduction in abundance, not just in areas where dog walking was common, but also where it was prohibited (Banks and Bryant 2007). Moreover, this study found no evidence of habituation even with leashed dogs and even where dog-walking was frequent; the disturbance was much weaker for people than dogs (Banks and Bryant 2007). Studies in California and Colorado showed that bobcats avoided areas where dogs were present, both in terms of spatial displacement (George and Crooks 2006, Lenth et al. 2008, Reed and Merenlender 2011) and temporal displacement in which bobcats switched to nighttime for most activities (George and Crooks 2006). In Colorado, mule deer showed reduced activity within 66 m of trails where dogs were prohibited (i.e., response to people only), but within 100 m of trails where dogs were allowed (Miller et al. 2001). Similar effects were also found for small mammals, including squirrels, rabbits, chipmunks, mice, prairie dogs (Bekoff and Ickes 1999, Lenth et al. 2008), and marmots (Griffin et al. 2007).

4.6.7. Habituation of Wildlife to Human Disturbance

First described in the field of neuroscience, habituation is a concept that should be considered relative to potential impacts of the visiting public on wildlife. Simply put, do wildlife ever just “get used to it”? In neurobiology, this effect is generally defined as a form of (non-associative) learning: the magnitude of the (typically physiological) response to a specific stimulus decreases with repeated exposure to that stimulus (Grissom and Bhatnaga 2009). Exposure to human activity can cause animals to avoid human-dominated areas or shift temporal activity patterns (Frid and Dill 2002, reviewed in Dertien et al. 2021), but repeated, benign exposure can also result, in some situations, in habituation of individuals, leading to some degree of human tolerance (Wheat and Wilmers 2016).

Studies suggest that habituation is more likely when a recreational activity is visually and acoustically predictable in location and time (Cassirer et al. 1992), and that propensity toward habituation varies by species and even individual temperament (Papouchis et al. 2001, Martin and Reale 2008). Sex and breeding status may also mediate the response or likelihood of habituation (Papouchis et al. 2001, Gómez-Serrano 2021). For example, in a coastal population of nesting plovers in Spain that displayed some degree of habituation to humans, females nesting plovers flushed more frequently than males, suggesting that they may perceive risk differently (Gómez-Serrano 2021).

While potentially beneficial to some species at certain places and times (e.g., Larson et al. 2016, Bateman and Fleming 2017), habituation can also be considered negative at the community level (e.g., George and Crooks 2006, Larson et al. 2016). Species that are more likely to habituate to recreation-related disturbances are often habitat generalists, and some studies have documented habitat generalists moving into a disturbed area while habitat specialists become displaced (e.g., Ballenger and Ortega 2001, Rolando et al. 2013). Some habitat generalist species, such as crows and ravens, may also represent additional predation pressure on the resident community. Predator, meso-predator, and prey species can also be differentially affected by recreation and these dynamics can lead to altered wildlife community composition (Miller et al. 2020).

Habituation does not necessarily mean the absence of a predator-avoidance response, or lack of elevated stress in response to human disturbance. Habituation of nest return times of plovers on a beach in Spain were shorter on disturbed beaches, suggesting habituation to the human disturbance, yet the birds still flushed in response to human intrusion (Gomez-Serrano 2001). In a study that measured levels of fecal glucocorticoid metabolites (FGCMs; proxy for physiological stress) in gorillas exposed to ecotourism, habituated gorillas had higher levels of FGCM than the unhabituated group (Shutt et al. 2014). Even well-habituated gorillas remained vulnerable to variation in their exposure to humans and experienced greater stress levels when human observers violated the distance buffer they were habituated to (Shutt et al. 2014).

Habituation to the disturbance stimulus has limits, particularly in the case of dogs (Hennings 2017, Gomez-Serrano 2021). This limitation is likely related to the unpredictable, erratic behavior and movements of domestic dogs, which influences three key factors wildlife use to judge the threat of predation: predictability, proximity, and speed (Glover et al. 2011, Weston and Stankowich 2014).

Although not studied directly in Pacific pocket mice or other sensitive wildlife on the Preserve, habituation, when it occurs, is a function of response to a particular stimulus. It may be more likely to occur, if at all, when the stimulus is predictable—that is, similar in its characteristics of timing, intensity, duration, and so forth. Yet human use of a trail, even within the same schedule, offers much variation in other characteristics—including the intensity and duration of sounds, smells, movements, and vibrations. While “public presence” may be defined as an “effect”, it may reasonably be a set of potential stimuli that are not predictable because of the constantly changing composition, density, and timing while on the trail, even with all those variations occurring within a set period of time.

Some generalizations that suggest caution in relying on habituation as a mitigating factor in human disturbance to wildlife are that habituation to strong stimuli is not likely, or is less likely, to occur (e.g., Thompson and Spencer 1966); that habituation is a lowering of response and does not necessarily mean there is no cost to the response; and that habituation could be maladaptive if it is transferred to responses to other stimuli (e.g., lowering response to predators).

5. Discussion on public use and impacts

For much of the period from 2009—when the trail on the Preserve was first opened to the public—until the COVID-related substantial closure in 2020, the trail usually was open to the public seven days per week, 7:00 a.m. to sunset. However, there was no underlying research or principles that supported this amount of public access in relation to the need to protect the sensitive onsite natural resources. Indeed, the most basic principle in the field of recreational ecology—an interdisciplinary field that studies the ecological impacts of recreational activities and the management of these activities—is that if outdoor recreation is allowed in an area, impacts to that ecosystem are inevitable (D'Antonio 2020). Indeed, if the only goal pertaining to the Preserve was to protect the Pacific pocket mouse, the most protective strategy would be to prohibit public access. The Preserve is an exceedingly small area of habitat, only 29 acres, and is surrounded by development that destroyed much of the original similar habitat.

While appreciating and supporting the desire for public access, CNLM recognizes that such access is not without consequences. Although ideally and generally the visiting public is respectful of the posted Preserve rules, there are many incidents of noncompliance, some escalating to law enforcement actions. But long before they escalate to that level, and for the many that do not, there is the likelihood of natural resource impacts—that could include trampling the burrows of Pacific pocket mouse; damaging plants that serve as food sources, nesting locations, shelter, and protection for wildlife; harassment of wildlife including impacts on reproduction; and other effects. Staff resources (and with assistance from volunteers and City of Dana Point staff) are deployed to best effect to try to minimize those impacts, but pre-detection impacts, as well as those that go undetected, are not possible to eliminate. Although those public behaviors can be reduced by constant monitoring, it's not feasible to completely eliminate this behavior or these impacts.

Research results continue to grow that provide evidence of impacts from public visitation—even that which is consistent with "trail rules". An additional perspective on harmful effects from "non-consumptive" public uses (e.g., hiking) of such trails has been provided by studies that arose from the exclusion or reduction of public use of parks and natural areas during a certain stage of the COVID-19 pandemic.

Some human uses of the Preserve are arguably more important than others; and even for important uses, some are more conducive to discretion and control than others. Important uses include those related to public safety—such as police and fire response to issues in the vicinity of the Preserve. Management and monitoring activities conducted by CNLM and its agents are critical to providing support for the persistence of the natural resources onsite, including the two listed species. Research activities can sometimes be directed to other sites, but sometimes essential information can only be gained by its conduct within the Preserve. Access for the general public for walking, nature appreciation, and nature education is an important use—but also has other venues for expression besides the Preserve and can be more controlled than other important activities.

This recognition of all human uses—including those that are and are not allowed, and the relative importance—is significant because the potential for impacts from all of those uses and their impacts are cumulative, and potentially additive and interactive. Further, there are impacts from other sources (e.g., rapid climate change, Argentine ants, current and future pathogens) that are also cumulative and are not easily controlled.

Given all the influences on species in their natural environments, it is rarely possible to construct an experimental frame that allows one to test response of a species to a single variable—such as public use of a trail. It is particularly difficult to derive such direct information in a short period of time, or when rare or endangered species are involved (thus limiting the ability to manipulate and place at risk those species). However, science-based information that is relevant to guiding management of conservation areas can be reasonably gained from studies in other locations where the research can be designed more appropriately, conducted over a longer period of time, or accumulated from many sources. Indeed, selection and application of appropriate scientific principles and peer-reviewed scientific literature are the foundation of managing specific natural areas. From this literature review, there is much evidence and reason for concern about the impacts of public use of the trail.

Without additional controls, as were implemented in 2020 and continued into 2021 and 2022, public use of the Preserve was undoubtedly increasing, as reflected in trail use counter data. Average per-day use doubled over a seven-year period (2011-2017) and data from early 2020 indicated that these rates were continuing to increase. Further, plans for a boutique hotel adjacent to the Preserve could result in even higher rates of visitation by bringing a new population of visitors in close proximity of the Preserve and potentially onto the trail (Headlands Reserve LLC 2004). In addition to the potential that this or other developments has for increased number of visitors to the Preserve, there is also the potential for additional neighborhood noise and night-lighting—the latter, in particular, having been shown to negatively impact another endangered heteromyid, the Stephen's kangaroo rat (Shier et al. 2020).

Impacts from public visitation are reasonably related to amount of use (number of visitors) and compliance (or not) with trail rules. Time of year and time of day of public use would also reasonably be related to impact on the natural resources. For example, certain wildlife species tend to be more active during periods of low light, making it potentially more impactful if the public is on site during low-light conditions (early morning, late afternoon, generally). Certain times of year (for example, corresponding with reproductive activity of certain species), may also be indicative of the potential for greater impact from the visiting public. To date, there is insufficient evidence to suggest that non-compliance is associated with certain times of the day, days of the week, or times of the year. As such, the plan for public access does not derive much guidance from that concern. However, it has been demonstrated that the amount of public use can be modified by direct control of hours of (trail) operation. As needed, the trail can also be closed (entirely, or certain sections) to protect sensitive nesting locations for gnatcatcher, or during the PPM breeding season, for example.

The trail use data in 2021-2022 provide some insight into average daily use when trail access “hours of operation” are changed. The data indicate that trail use, when limited to three days per week and eight hours per day, is considerably lower than trail visitation rates when the trail is open seven days per week, 7:00 a.m. to sunset. As discussed earlier, the control of “trail hours” has resulted in lower daily average visitation rates (than in early 2020, before additional controls were implemented) and lower weekly and annual rates, as a result. Although those data are not exhaustive in their extent, they do suggest that restricting the days and hours of trail usage can also limit the number of visitors. That is, potential visitations do not simply funnel into a smaller time period if days and hours of visitation are reduced. However, the visitation rates, when shifted to a three-day-per-week schedule, remain higher than the average per-day visitation rates in 2009—when the Preserve was first open to the public. While reduction of hours of trail operation—through a combination of days and hours-per-day that the Preserve is open to the public—has been shown to reduce number of visitors and thus likely impact, data show that reduced days and hours still allow considerable public access and at a rate similar to or greater than that in 2009 when the trail was first opened to the public.

In considering appropriate means of reducing the impacts from public use of the Preserve, the potential for habituation of wildlife species was researched and considered. That is, whether a regular and daily schedule of public use would be less impactful than some daily closures. The scientific literature is far from comprehensive on this topic and none of it is based specifically on gnatcatcher or Pacific pocket mouse. However, in both theory and in the case studies that were reviewed, there is little evidence to suggest that there would be habituation to public presence, or that the habituation, if attained, would not be impactful. Regarding the latter, habituation would not likely cancel the public effect, but, at most, reduce it. Further, habituation could be maladaptive. But most importantly, there is no reason to assume that the public presence is perceived as “one stimulus” to which any species could become habituated. The public presence is a constellation of stimuli—sights, sounds, smells, vibrations, and movements—that change over the course of the day and between days. Further, there is evidence that males and females may habituate differently, if at all. Together, there was no indication that habituation was likely or would be beneficial. As such, the value of relief from such stimuli by designating some days as having no public hours for visitation, remained as a consideration with much merit. Furthermore, this approach would allow for more influence on the degree of public visitation than could be afforded simply by reducing the number of hours per day.

In summary, the combination of increasing use of the Preserve by the public, combined with the increasing evidence of negative impacts from human use on the natural resources including the listed species onsite, strongly indicate a need for a shift in the “balance” between public use of the Preserve for recreation and aesthetic enjoyment and the protection and conservation of the threatened and endangered species and their resident and rare ecosystem. This balance is best achieved by adjusting the days and hours-within-days of operation (i.e., public trail hours) of the Preserve.

6. Public access principles and plan

To fulfill the purpose for which the Preserve was acquired and to protect and manage the resident natural resources, it is imperative that staff continue to control public access. Control is needed because of negative impacts from public access on the natural resources and the trajectory of increasing public use without changes to the hours of operations.

The intent of this plan is to consider current information towards developing a public access schedule that appropriately addresses a balance between public access and protection of sensitive (even endangered) natural resources. As reflected in the comments by wildlife agencies on the previous draft of this Update, it is important to consider modifying public access within the Preserve to ameliorate the threat that the increasing popularity of the Preserve to the public may present to the Dana Point PPM population (USFWS and CDFW 2022). To serve the dual objectives of providing reasonable public access while protecting the rare and sensitive (and, in the case of two species, endangered or threatened) species on the Dana Point Preserve, trail hours will be guided by the following objectives:

1. Reduce the impact of public visitation on the natural resources of the Preserve by controlling hours of operation.

2. Continue to provide an appropriate amount of public access—an amount that accommodates a considerable number of visitors while limiting harm to the sensitive and endangered natural resources onsite.

3. Continue to provide access for other human uses including use by first responders and researchers.

4. Enhance efforts to provide information to the public about the sensitivity of natural onsite resources, the impacts that can occur from public presence, and the reasons for controlling public access.

5. Continue to monitor public visitation for trends in behavior (compliance with trail rules) and number of visitors over time.

6. Continue to monitor relevant scientific literature and onsite biological resources and to consult with other appropriate scientists and conservation practitioners to determine relationships between public visitation and natural resource conditions.

To serve those objectives, the following plan has been developed.

1. Determine and establish hours of operation (days of week/hours per day) for the public trail using the following as guidance:

    - Avoid low-light visitation periods by providing public access well after dawn and well before dusk
    - Provide at least two “recovery days” per week when trail is closed to the public
    - Consider public input on preferred times/days (e.g., survey)
    - Consider ways to minimize the likelihood of confusion (of the public) regarding the trail hours of operation
    - Consider coincidence with schedule for Nature Interpretive Center, currently open five days per week, six hours per day (website queried 03/31/2022; https://www.danapoint.org/department/general-services/parks/natural-resources/dana-point-headlands-conservation-area/nature-interpretive-center)
    - Implement regular schedule to avoid public confusion or frustration and modify only as needed
    - Continue to implement unscheduled closures for extreme events such as unsafe trail conditions, particularly sensitive periods for natural resources, emergencies onsite or in vicinity, and similar conditions
    - “Hours Notice”: As part of adaptive management, provide trail hours to the public; Provide notification of regular hours of operation through an "Hours Notice"; Additionally, publish this information on the CNLM website and post at the Preserve

2. Revisit, revise, and implement a more robust public awareness/education program:

    - Revisit signage and education materials on and available at the Preserve to provide more information on public impacts and site sensitivity
    - Revisit lengthy lists of prohibited activities and determine if “allowed activities” list would be more effective
    - Provide more detailed information on the CNLM website regarding literature related to public impacts on natural resources

3. Conduct outreach to others who potentially use the Preserve for important activities:

    - Maintain relationships with CDFW’s Enforcement branch (i.e., Game Wardens), Orange County Sheriff’s Department, and Orange County Fire Authority regarding protection of the Preserve, emergency use, and training
    - Maintain protocol for any proposed research on the Preserve including review of research proposals for risks, conservation value, and opportunity to conduct research elsewhere; Execute research agreement for any approved research to ensure clear communication on allowed activities and to address liability
    - Consider additional outreach to underserved communities for trail access and enhanced educational experience

4. Conduct research and adaptively manage to serve the conservation values of the Preserve

    - Continue to monitor biological resources and public use
    - Determine relationships between public visitation and natural resource condition

- Adaptively manage to mitigate for known threats and impacts as well as unknown threats
- Consult with other Pacific pocket mouse experts to address specific questions about the species and the response to public use

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Appendix A. Summary of literature pertaining to biological impacts of recreational and anthropogenic disturbances.

Author	Taxa or Species	Location	Objectives	Result
Allen et al. 2021	Song sparrows (*Melospiza melo-dia*)	British Columbia, Canada	Experimentally manipulated fear in wild songbird populations over 3 breeding seasons by broadcasting playbacks of either predator or nonpredator vocalizations, quantified effects on components of population growth.	Fear (stimulated by predator call playback) significantly reduced population growth rate through cumulative, compounding adverse effects on fecundity and offspring survival. Parents exposed to predator playback produced 53% fewer recruits to adult breeding population. "Fear" itself was projected to halve the population size in 5 years.
Anze and Koper 2018	Savannah sparrows (*Passerculus sandwichensis*)	Alberta, Canada	Influence of anthropogenic noise (industrial Infrastructure) on anti-predator behavior.	Greatest impacts on behavior were detected at the noisiest treatment; feeding latency was shortened compared with control sites, which may expose nests to greater predation risk.
Arlettaz et al. 2007	Black grouse (*Tetrao tetrix*)	Switzerland	Evaluated the physiological stress response (corticosterone levels) after disturbance induced by snow sports.	Birds in disturbed habitat had significantly higher concentrations corticosterone metabolites than those in habitats with no/very limited human disturbance. Corticosterone did not differ between habitats with moderate vs. high human disturbance.
Banks and Bryant 2007	Birds, multiple species	Australia	Experimentally manipulated dog walking at woodland sites adjacent to urban areas and monitored response of multi-species bird assemblages.	Dog walking in woodlands led to a 35% reduction in bird diversity and 41% reduction in abundance, both in areas where dog walking is common and where dogs are prohibited.
Barber et al. 2010	Multiple species	Multiple	A review of impacts of chronic noise exposure studies on terrestrial organisms.	A broad range of findings that indicate the potential severity of this threat to diverse taxa, and recent studies that document substantial changes in foraging and anti-predator behavior, reproductive success, density, and community structure in response to noise.
Barros and Pickering 2017	Plant communities	Argentina	Impact of informal trails and off-rail use on plant communities in protected areas of high conservation value.	Vegetation in 90% of valley damaged by visitor use. Informal trails and trampling off-trail can cause landscape-scale damage.
Bateman and Fleming 2017	Multiple species	Multiple	Literature review to compare and contrast different measures of response to tourist activities (avoidance responses, time budgets, and physiological responses).	Most studies reviewed interpret data as negative impacts of tourist activities; this review finds that behavioral data (flight responses and time budgets) often indicated positive effects; time budget data are often ambiguous, while physiological data tended to show negative responses.
Beale and Monaghan 2005	Black-legged kittiwakes (*Rissa tridactyla*), common murres (*Uria aalge*)	Scotland	Examined the relationship between daily visitor numbers and daily failure rates of nests in two species of seabirds.	Daily failure rates for kittiwakes increased slightly on days with higher visitor numbers. For murres, failure rate declined seasonally but was not significantly correlated with visitor numbers.

Author	Taxa or Species	Location	Objectives	Result
Bennett et al. 2013	Karner blue butterfly (*Lycaeides melissa samuelis*)	Indiana, USA	Used field surveys and simulations to examine response of butterflies to recreation, including oviposition rate and host plant choice; tested management strategies to alleviate recreation impacts.	Butterflies were sensitive to recreational disturbance and flushed at similar speeds and distances from recreationists as they would from natural threats, such as predators. Simulation models indicated that regular disturbance could reduce egg laying potential and significantly restrict host plant choice.
Blair and Launer 1997	multiple	California, USA	Butterfly diversity and human land use; Species assemblages along an urban gradient.	Species richness and diversity of butterflies peaked at moderately disturbed sites while relative abundance decreased from natural to urban areas.
Blickley et al. 2012	Greater Sage-Grouse (*Centrocercus urophasianus*)	Wyoming, USA	Experimentally tested effects of chronic noise from human activities on sage grouse at leks.	Peak male attendance (i.e., abundance) at leks experimentally treated with anthropogenic noise from natural gas drilling and roads decreased 29% and 73%, respectively. There was limited evidence for an effect on peak female attendance.
Bötsch et al. 2017	Forest-nesting birds, multiple species	France	Measured disturbance of walking trail activity on birds during territory establishment.	Number of territories and species richness in disturbed (recreational walkers) areas substantially reduced compared with control plots (no walkers). Species most affected were open-cup nesters and above-ground foragers.
Boyes et al. 2021	Moth caterpillars (Lepidoptera)	England	Evaluated the impacts of nighttime lighting on wild caterpillars.	Street lighting strongly reduced moth caterpillar abundance compared with unlit site, affected caterpillar development, and disrupted the feeding behavior of nocturnal caterpillars.
Cassirer et al. 1992	Elk (*Cervus elaphus*)	Montana and Wyoming, USA	Measured movements of habituated and unhabituated populations of elk when disturbed by cross-country skiers to assess energy costs and identify factors that might influence elk behavior.	Among habituated elk, "predictability" of disturbance influenced response. Unhabituated elk responded similarly to skiers and logging disturbance; flight distance was related to topographic features. Elk often returned to area following displacement. Estimated energy expenditure from displacement was 5.5% of total daily expenditure, increasing exponentially with snow depth.
Cushman and Meetenmeyer 2008	Forest pathogen (*Phytophthora ramorum*)	California, USA	Examined the influence of humans and a range of environmental factors on the distribution of *P. ramorum* at three distinct spatial scales (along hiking trails, open space with public access, and human population density).	*P. ramorum* more commonly occurred in soil on hiking trails used heavily by humans than in soil from adjacent areas off trails. Forests on public land open to recreation had higher prevalence of disease than forests on private lands. Probability of disease occurrence increased significantly with population density in the surrounding area.

Author	Taxa or Species	Location	Objectives	Result
Derryberry et al. 2020	White-crowned sparrow (*Zonotrichia leucophrys*)	California, USA	Compared soundscapes and songs before and during Covid-19 shutdown; evaluated whether a songbird exploited newly emptied acoustic space.	Noise levels in urban areas were substantially lower during the shutdown, characteristic of traffic in the mid-1950s. Birds responded by producing higher performance songs at lower amplitudes, effectively maximizing communication distance and salience.
Dertien et al. 2021	Multiple species	Multiple	Reviewed research on the effect of non-consumptive recreation on wildlife to identify effect thresholds or the point at which recreation begins to exhibit behavioral or physiological change to wildlife.	Threshold distances varied substantially within and amongst taxonomic groups. Threshold distances for wading and passerine birds were <100m, but >400m for hawks and eagles. Mammal threshold distances varied widely from 50m for small rodents to 1,000m for large ungulates.
Fernández-Juricic 2001	House sparrow (*Passer domesticus*), common blackbird (*Turdus merula*), common wood pigeon (*Columba palumbus*), Eurasian magpie (*Pica pica*)	Spain	Examined factors that influence alert distances to pedestrian approaches in five large wooded open space.	Habitat structure modified alert distances: bird tolerance increased with greater availability of escape cover. Alert distances varied among species, with large species being less tolerant of human disturbance than small ones.
Ficetola et al. 2007	Terrestrial vertebrates (small mammals, birds, reptiles, and amphibians)	Italy	Examined recreation disturbance (people presence, trampling) on distribution of animals in urban parks.	Disturbance and forest maturity influenced the distribution of some species and the species richness of amphibians and reptiles; however, the pattern was not consistent across species within taxa or among taxa.
Finney et al. 2005	Golden plover (*Pluvialis apricaria*)	United Kingdom	Impact of recreational disturbance (intensity and extent) on the distribution and reproductive success of plovers breeding in proximity to an intensively used trail.	Prior to trail resurfacing, when people strayed from the footpath, plovers avoided areas within 200m of the trail during chick-rearing. After trail resurfacing, >96% of walkers remained on-trail, and plovers avoided areas within only 50m of the footpath. No detectable impact of disturbance on reproductive performance.
Frid and Dill 2002	Multiple species	Multiple	A review of studies where predation and nonlethal disturbance stimuli are proposed to create similar trade-offs between avoiding perceived risk and fitness-enhancing activities (feeding, parental care, mating); provide theoretical framework for human-caused disturbance stimuli as a form of predation risk.	Most literature examples were consistent with predictions of the risk-disturbance hypothesis (human-caused disturbance stimuli as a form of predation risk).

Author	Taxa or Species	Location	Objectives	Result
George and Crooks 2006	Bobcat (*Lynx rufus*), coyote (*Canis latrans*), and mule deer (*Odocoileus hemionus*)	California, USA	Investigated the relationship between large mammal spatial and temporal activity patterns and human recreation in an urban nature reserve using camera trapping.	Bobcats, and to a lesser degree coyotes, exhibited both spatial and temporal displacement in response to human recreation. No effect was detected for mule deer.
Glover et al. 2011	Shorebirds, multiple species	Australia	Measured the distance at which a response (flight initiation distance [FID]) occurred among 28 shorebird species when presented with an approaching human.	FID differed by species; species with higher body masses had longer FIDs. Mean FIDs for species were 18.6–126m. FID was influenced by starting distance of human approach, flock size, previous exposure to humans, and stimulus type (walker, jogger, walker with dog).
Gomez-Serrano 2021	Kentish plover (*Charadrius alexandrines*)	Spain	Estimated the impact of human presence affects breeding birds.	Walkers, when accompanied by dogs flushed plovers 80-93% of the time, whereas pedestrians alone flushed plovers 13-47.6% of the time. Nest return times were shorter on disturbed beaches, suggesting habituation to the human disturbance.
Gutzwiller et al. 1994	Birds, multiple species	Wyoming, USA	Effects of human intrusion on song occurrence and singing consistency in subalpine birds.	Singing by several species was not influenced by intrusion. For some species, song occurrence and singing consistency were higher on controls than on intruded sites, indicating intrusion reduced singing activity.
Habib et al. 2007	Ovenbirds (*Seiurus aurocapillain*)	Alberta, Canada	Assessed pairing success and age distribution of birds in boreal forests around noise-generating compressor stations compared with areas around habitat-disturbed, but noiseless, wellpads.	Significant reduction in ovenbird pairing success at compressor sites compared with noiseless sites. Significantly more inexperienced birds breeding for the first time were found near noise-generating compressor stations than noiseless well pads.
Hennings 2016, 2017	Multiple species	Multiple	This document reviews the literature on overall and relative effects of three user groups – hikers, mountain bikers and equestrians – on trails, habitat, and wildlife to help inform ecologically appropriate placement and construction of trails in natural areas.	Trails and trail use can damage natural areas by negatively affecting soils, vegetation, water quality, plants, and animals. Human disturbance increases animals' stress and can cause them to hide, change behavior or flee. Some species, such as those that do well in urban areas, are generalists and can tolerate human disturbance. Other species such as pregnant animals, long-distance migrants, and habitat specialists tend to be more stressed and displaced by trail users. Some species may permanently leave a natural area. A 2016 review specific to dog impacts on wildlife and water quality is included as Appendix 1.

Author	Taxa or Species	Location	Objectives	Result
Kangas et al. 2010	Birds, multiple species	Finland	Examined effects of recreation on forest bird communities in protected areas. Bird data collected along hiking trails and in undisturbed control areas were related to number of visits, area of tourism infrastructure, and habitat variables.	Results indicate that number of visits affects occurrence and composition of bird communities, but not species richness. Open-cup nesters breeding on ground showed strongest negative response to visitor pressure, while open-cup nesters in trees/shrubs were more tolerant. No significant impact detected for cavity-nesting birds.
Larson et al. 2016	Multiple species	Global	Conducted a systematic review of the scientific literature and analyzed 274 articles on the effects of non-consumptive recreation on animals, across all geographic areas, taxonomic groups, and recreation activities. Quantified trends in publication rates and outlets, identified knowledge gaps, and assessed evidence for effects of recreation.	Over 93% of reviewed articles documented at least one effect of recreation on animals, the majority of which (59%) were classified as negative. Studies of amphibians, reptiles, and fish are lacking. Some taxonomic groups (e.g., raptors, shorebirds, ungulates, and corals) had greater evidence for an effect of recreation. Non-motorized activities had more evidence for a negative effect of recreation than motorized activities, with effects observed 1.2 times more frequently.
Larson et al. 2018	Multiple species and subspecies of conservation concern in southern Ca.	California, USA	Modeled visitation rates for regional preserves, exposure of sensitive species, factors driving visitation rates.	Accessibility (numbers of housing units and parking lots) had positive relationships with visitation rates. Orange-throated whiptail (*Aspidoscelis hyperythra*), western spadefoot (*Spea hammondii*), and coastal California gnatcatcher (*Polioptila californica californica*), are likely exposed to high levels of recreational activity.
Larson et al. 2019	Birds, mammals, reptiles	Global	Conducted a global meta-analysis of the effects of recreation on vertebrate richness and abundance. Included 34 articles.	Species richness and abundance were lower in association with higher levels of recreation. In approximately 7 of 10 comparisons, vertebrate richness or abundance is expected to be lower with higher levels of recreation.
Liedtke et al. 2020	Native and non-native plants, multiple species	Chile	Evaluated the importance of hiking trails for plant invasion in protected mountain areas.	Hiking trails foster non-native species (NN) spread into mountains; NN at higher elevations are a subset of the lowland source pool and NN number and cover decreases with increasing elevation and distance to trails.
Lucas 2020 (*in* CDFW 2020)	Multiple species	Multiple locations	A literature review of recreation-related disturbances to wildlife; explores sustainability of dual-role preservation area (those used for conservation and recreation).	Evidence from literature indicates incompatibility between recreation and conservation goals of dual-role protected areas.
Mitrovich et al. 2020 (*in* CDFW 2020)	Multiple species	USA	Review of effects of recreation on wildlife; Case study of recreation-wildlife conflicts; discussion of options to balance human interest for recreation and the impacts on wildlife.	Authors provide comprehensive list of recommendations to achieve best recreation and conservation outcomes and minimize negative impacts of recreation.

Author	Taxa or Species	Location	Objectives	Result
Mallord et al. 2007	Woodlark (*Lullula arborea*)	England	Impact of recreational disturbance on population size	Bird density lower on sites with more disturbance. Probability of suitable habitat being colonized s lower in areas with greater disturbance. No relationship between disturbance and daily nest survival rates. Birds on heaths with higher levels of disturbance fledged more chicks (per pair) because of a strong density-dependent increase in reproductive output.
Martin and Réale 2008	Eastern chipmunks (*Tamias striatus*)	Quebec, Canada	Investigated the relationship between exploration, grooming-scanning continuum, emotionality, and docility of individual chipmunks and location of their burrow respective to frequentation by humans; assessed the relationship between hair cortisol and both temperament and frequentation by humans.	Explorative or docile chipmunks were more common in frequented areas. Hair cortisol increased with docility but was not related to human frequentation, indicating that temperament may cause animals to distribute themselves in a non-random way in response to human disturbance.
Miller et al. 2001	Birds, multiple species; Mule deer (*Odocoileus hemionus*)	Colorado, USA	Assessed the “area of influence” for human disturbance treatment by determining the probability that an animal would flush or become alert (for mule deer only).	For mule deer, the presence of a dog resulted in a greater area of influence, alert and flush distance, and distance moved than when a pedestrian was alone while for grassland and forest birds, the reaction to dogs and people were similar.
Miller and Hobbs 2000	Birds (artificial nests), multiple species	Colorado, USA	Effect of recreational trails on the risk of nest predation and nest predator activity at lowland riparian sites.	Predation rates were high (94%). Vulnerability to predation differed by transect types (on-trail, off-trail, near trail); predation rates tended to increase with distance from trails. Birds predators were more common near trails than away from trails, whereas mammals appeared to avoid nests near trails.
Naylor et al. 2009	American elk (*Cervus elaphus*)	Oregon, USA	Measured responses of elk (*Cervus elaphus*) to motorized and nonmotorized off-road recreational disturbance (ATV, mountain biking, horseback riding, hiking).	Elk increased their travel time in response to all disturbance types especially ATVs, followed by mountain biking, hiking, and horseback riding. Feeding time decreased during ATV exposure and resting decreased when elk were subjected to mountain biking and hiking disturbance.
Papouchis et al. 2001	Desert bighorn sheep (*Ovis canadensis nelsoni*)	Utah, USA	Compared behavioral responses of sheep to recreational activity between a low visitor use area and a high visitor use area by observing behavioral responses, distances moved, and duration of responses to vehicles, mountain bikers, and humans on foot.	Hikers caused more severe disturbance than vehicles and mountain bikers. There was considerable individual heterogeneity in responses, as well as differences in responses by male and females depending on breeding status. Avoidance of road corridor by some animals represented 15% less use of potential suitable habitat.

Author	Taxa or Species	Location	Objectives	Result
Patton et al. 2019	Mammals, multiple species	California, USA	Examined diel shifts in response to human activity; implication for predator-prey dynamics.	Two species, one predator and one prey, avoid human activity via a temporal shift to become more nocturnal—activity was centered near dawn on days without human activity but nearer to midnight on days with human activity.
Persons and Eason 2017	White-footed mice (*Peromyscus leucopus*)	Kentucky, USA	Effects of habitat and abiotic factors, and human presence on anti-predator behavior of mice foraging in an urban park.	Increased human presence negatively affected foraging behavior across treatments. Human presence and light pollution led to modification of foraging behavior.
Reed and Merenlender 2008	Mammalian carnivores, multiple species	California, USA	Combined noninvasive survey techniques and DNA verification of species identifications to survey for mammalian carnivores in 28 parks and preserves.	Paired comparisons of neighboring protected areas with and without recreation show that presence of dispersed, nonmotorized recreation led to a five-fold decline in the density of native carnivores and a substantial shift in community composition from native to nonnative species.
Reilley et al. 2017	Mountain lion (*Puma concolor*), Virginia opossum (*Didelphis virginiana*), coyote (*Canis latrans*), striped skunk (*Mephitis mephitis*)	California, USA	Used camera traps to quantify habitat use and activity patterns of wild mammals and human recreationists in protected areas; modeled habitat use with a multi-species occupancy model.	Habitat use was most associated with environmental covariates. Domestic dog presence was negatively associated with habitat use of mountain lions and opossum. Coyotes were more active at night/less active during day in areas with high levels of recreation. Skunks were more active in late morning in areas with human recreation. Smaller nocturnal carnivores may not be directly affected by daytime recreational activities.
Rolando et al. 2013	Multiple species	Italy	Quantify effects of effect of ski-pistes on birds and small mammals.	Ski-pistes below tree line produce a negative edge effect and were associated with lower bird diversity and species richness; forest plots adjacent to ski-pistes had lower bird abundance; small forest mammals avoid ski-pistes, but open habitat species colonized them.
Rutz et al. 2020	Multiple species	Global	Discussion of COVID-19 lockdown effects on wildlife and the opportunity this presents for researchers to quantify the effects of human activity on wildlife.	Reduction in human mobility during Covid-19 shutdown (“Anthropause”) is unparalleled. Anecdotal observations show wildlife responded by increased movement into new places, etc. Authors encourage and discuss how collaborative research on Anthropause effects can maximize scientific insight and enable detailed, mechanistic understanding of human-wildlife interactions.

Author	Taxa or Species	Location	Objectives	Result
Schroeder et al. 2012	House sparrow (*Passer domesticus*)	United Kingdom	Examined how noise might reduce reproductive output in passerine birds: e.g., by impairing mate choice, by reducing territory quality, and/or by impeding chick development.	Nests in areas affected by noise from large generators produced fewer young, of lower body mass, and fewer recruits; females nesting in noisy areas fed young less often. Nest box occupancy, parental body mass, age and reproductive investment did not differ significantly between noisy and quiet areas.
Schrimpf et al. 2021	Birds, multiple species	Canada and USA	Used records of >4.3 million birds observed by volunteers from March to May 2017-2020 to examine how reduced human activity during COVID-19 altered avian land use.	Counts of 80% of focal bird species changed in pandemic-altered areas, usually increasing in comparison to pre-pandemic abundances in urban habitat, near major roads and airports, and in counties where lockdowns were more pronounced or concurrent with peak bird migration.
Shier et al. 2012	Stephen's kangaroo rat (*Dipodomys stephensi*; SKR)	California, USA	Examined response of SKR to playbacks of footdrumming overlaid with experimental and control background noises.	Spectral characteristics of traffic noise overlap extensively with footdrumming signals of SKR. Traffic noise masks, and may mimic, footdrumming signals. Results suggest that anthropogenic noise may function as a deceptive signal.
Shier et al. 2020	Stephen's kangaroo rat (*Dipodomys stephensi*)	California, USA	Impacts of artificial light at night (ALAN) on foraging decisions of kangaroo rats.	Artificial light negatively impacted foraging decisions of endangered kangaroo rats; ALAN reduces habitat suitability and may potentially impede the recovery of at-risk nocturnal rodents.
Shutt et al. 2014	Western lowland gorillas (*Gorilla gorilla gorilla*)	Central African Republic	Investigated effects of ecotourism on the faecal glucocorticoid metabolites (FGCM) response of wild gorillas.	Two out of three human-contacted groups had higher FGCMs than unhabituated gorillas. FGCMs increased in between contacts up to 21 days in gorillas under habituation.
Slabbekoorn and Ripmeester 2008	Great tits (*Parus major*); additional songbird species covered in review	Western Europe	Reviewed current evidence for whether and how anthropogenic noise plays a role in patterns of decline in bird diversity and density.	Omnipresence of anthropogenic sounds can negatively affect birds. Behavioral flexibility, such as song plasticity, may allow some species more time to adapt to human-altered environments.
Steven et al. 2011	Birds, multiple species	Global	A review of the recreation ecology literature published in academic journals.	Of 69 papers (1978-2010) that examined recreation effects on birds, 61(88%) found negative impacts, including changes in physiology, immediate behavior, changes in abundance, and reproductive success.
Sun and Liddle 1993	Vegetation	Australia	Examined impacts of recreation (vehicles and walkers) on plant species richness, vegetation characteristics, soil penetration, and soil organic matter.	Plant species differed in sensitivity to degrees of trampling. Woody plants occurred only on untrampled areas. Total species and vegetation height and cover were reduced as wear increased. Plant height was reduced dramatically by even light trampling. No clear relationship between soil organic matter content and trampling intensity.

Author	Taxa or Species	Location	Objectives	Result
Taylor and Knight 2003	Bison (*Bison bison*), mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra americana*)	Utah, USA	Measured responses of animals to hikers and mountain bikers at a state park by comparing alert distance, flight distance, and distance moved.	Based on a 200-m "area of influence" (7%) of park was potentially unsuitable for wildlife due to disturbance from recreation. Wildlife did not respond differently to mountain biking vs. hiking; there was a negative relationship between wildlife body size and response.
Thompson 2015	Birds, multiple species	Ontario, Canada	Impacts of recreational trails on a forest-dwelling bird community.	Significant positive influence of the area of trail-free habitat on bird density, but not species richness. Birds that nest or forage on the ground exhibited greatest response to presence of recreational trails.
Tost et al. 2020	Black grouse (*Tetrao tetrix*)	Germany	Trail use and activity impacts on habitat use of an endangered grouse.	Birds avoided the vicinity of public routes at distances directly related to intensity of human activity. Recreational disturbances appeared to significantly affect the effective habitat availability.
Wells et al. 2012	Native and non-native plants, multiple species	Colorado, USA	Examined distribution of alien plants at trailheads and trails.	Plant communities at trailheads and trails, and seed banks at trailheads, contain substantial diversity and abundance of non-native plants. Recreational trails may function as corridors that facilitate the spread of non-native species into wildlands.
Weston and Stankowich 2014	Multiple species	Global	This book chapter reviews evidence of disturbance to wildlife caused by dogs not accompanied by humans.	Summary of evidence from literature of dog disturbance on wild birds and mammals, as well as reptilian and amphibian species. Provides management recommendations.
Wheat and Wilmers 2016	Brown bears (*Ursus arctos*)	Alaska, USA	Tested how habituation and fear drive the foraging ecology of bears feeding on salmon.	Higher human activity was associated with increased nocturnality of non-habituated bears, likely leading to suboptimal foraging, but had no effect on habituated individuals.

PROOF OF SERVICE

***Center for Natural Lands Management v. City of Dana Point*, and Cross Action, Superior Court of Orange County Case No. 30-2021-01219668-CU-OR-CJC**

STATE OF CALIFORNIA, COUNTY OF ALAMEDA

At the time of service, I was over 18 years of age and not a party to this action. I am employed in the County of Alameda, State of California. My business address is 1999 Harrison Street, 9th Floor, Oakland, CA 94612.

On September 6, 2022, I served true copies of the following document(s) described as **DECLARATION OF ED PERT, Ph.D., IN OPPOSITION TO MOTION FOR PRELIMINARY INJUNCTION** on the interested parties in this action as follows:

Patrick Munoz, Esq. Jennifer Farrell, Esq. Robert Owen, Esq. RUTAN & TUCKER LLP 18575 Jamboree Road, 9th Floor Irvine, CA 92612	Attorneys for Defendant and Cross-Complainant CITY OF DANA POINT Telephone: (714) 641-5100 Facsimile: (714) 546-9035 Email: pmunoz@rutan.com jfarrell@rutan.com bowen@rutan.com

BY ELECTRONIC SERVICE: I electronically filed the document(s) with the Clerk of the Court by using the One Legal system. Participants in the case who are registered users will be served by the One Legal system. Participants in the case who are not registered users will be served by mail or by other means permitted by the court rules.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on September 6, 2022, at Oakland, California.

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SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF ORANGE

CENTER FOR NATURAL LANDS MANAGEMENT, a non-profit organization,

Plaintiff and Cross-Defendant,

v.

CITY OF DANA POINT; and DOES 1-50,

Defendants.

CITY OF DANA POINT,

Cross-Complainant,

v.

CENTER FOR NATURAL LANDS MANAGEMENT,

Cross-Defendant.

Case No. 30-2021-01219668-CU-OR-CJC

ASSIGNED FOR ALL PURPOSES TO: MICHAEL STRICKROTH, DEPARTMENT C15

FURTHER DECLARATION OF DEBORAH L. ROGERS, PH.D., IN OPPOSITION TO CITY OF DANA POINT'S MOTION FOR PRELIMINARY INJUNCTION

Hearing on Continued Motion
Reservation No.: 73774314

Date:	September 19, 2022
Time:	1:45p
Judge:	Hon. Michael J. Strickroth
Dept.:	C15

Action Filed:	September 7, 2021
Trial Date:	None Set

DECLARATION OF DEBORAH L. ROGERS, Ph.D.

I, DEBORAH L. ROGERS, declare as follows:

1. I am a party in the above-entitled action. I have personal knowledge of the facts set forth herein, except as to those stated on information and belief and, as to those, I am informed and believe them to be true. If called as a witness, I could and would competently testify to the matters stated herein.

2. I am Co-Executive Director and Director of Conservation Science and Stewardship at the Center for Natural Lands Management ("CNLM" or "Center"), a non-profit organization operating for the protection and management of natural resources.

3. As mentioned in my previous declaration, the Center's Dana Point Preserve ("Preserve") is an extremely important public resource for the protection of the federally endangered Pacific Pocket Mouse ("PPM"). It is one of only two locations (the other is Marine Corps Base Camp Pendleton) where the Pacific Pocket Mouse persists naturally in the wild.

4. In 2020, the Center entered into a cooperative agreement with and received funding (more than $800,000) from the U.S. Department of Defense ("DOD") to implement enhanced management on the Preserve for the Pacific Pocket Mouse. This is a mitigation project for DOD's activities at U.S. Marine Corps Base Camp Pendleton ("Base"), where the additional remaining PPM populations exist. The Dana Point Preserve was the only option available to DOD to mitigate for impacts on Base (e.g., due to troop training exercises) through enhancement of another PPM population in the wild. Attached as **Exhibit 1** is a true and correct copy of the Cooperative Agreement with DOD, dated September 2020.

5. As part of the Cooperative Agreement, the Center prepared the Dana Point Preserve (S033) Pacific Pocket Mouse Enhancement Management Plan, in coordination with the U.S. Fish and Wildlife Service ("USFWS"), U.S. Geological Survey, and U.S. Marine Corps, for the years 2020-2030. A true and correct copy of the 2020-2030 Pacific Pocket Mouse Enhancement Plan is attached as **Exhibit 2.** Failure to implement the terms of this Cooperative Agreement and to protect the PPM on the Preserve could undermine this mitigation project, thereby threatening Base activities and mission readiness.

6. Prior to the acquisition of the Preserve by CNLM, URS Corporation prepared a Habitat Management and Monitoring Plan in 2005 for the entire Dana Point Headlands Biological Open Space—a term that included both the area that is now the Preserve, as well as approximately 20 additional acres of City-owned property. The 2005 HMMP was reviewed by the California Coastal Commission (CCC), USFWS, CDFW, and the City. As acknowledged in the 2020-2030 Pacific Pocket Mouse Enhancement Plan, the Center was updating the HMMP simultaneously with implementation of the Enhancement Plan. As mentioned in my previous declaration, the Center completed an update to parts of the HMMP in 2022, with input from USFWS and the California Department of Fish and Wildlife. A true and correct copy of the 2022 Update to the HMMP is attached as **Exhibit 3.**

7. The City has several pages on its website that publicize the hours of operation and other information for the bluff-top trail and the Preserve. Attached as **Exhibit 4** are true and correct copies of the City's website, downloaded on August 25, 2022, containing information about the bluff-top trail and the Preserve. Included in Exhibit 4 is a full map of the City's Headlands Conservation Area Trail System, which shows how the bluff-top trail does not affect beach/water access or cause a disruption in the trail network.

8. The City also posts signage of the hours of operation and other information for the bluff-top trail. Attached as **Exhibit 5** is a true and correct photograph, taken on August 24, 2022, of such signage photographed near the bluff-top trail. The City has clearly represented the hours as those currently in place, and that have been in place since June 2021. Any change to the status quo (i.e., the current days and hours of operation) would require the City's and Center's public signage, brochures and websites to be revised and the Center to arrange for additional staffing.

9. As stated above, in its comments on the 2022 HMMP update, both USFWS and CDFW have stated that daily public access from dusk to dawn (as provided in the requested preliminary injunction), could pose significant harm to the existing PPM at the Preserve. Attached as **Exhibit 6** is a true and correct copy of a March 23, 2022, letter from Jonathan Snyder, USFWS, and David Mayer, CDFW, to the Center, providing that human disturbance of wildlife from non-consumptive recreation (e.g., hiking) can significantly and adversely impact the PPM with the

potential to cause extirpation of the PPM from this otherwise suitable habitat. The wildlife agencies note that "The HMMP further contemplated that the Habitat Manager (CNLM) would monitor public access and its consequences within the Preserve and would apply adaptive management to minimize impacts to individuals or populations of NCCP/HCP Identified Species from public access. … Based on the status of PPM within the Preserve and the available information regarding the potential effects of outdoor recreation on wildlife, we support the proposed changes to the public access schedule,"

10. As mentioned in my previous declaration, the Center occasionally closes all or parts of the bluff-top trail as needed for public safety, trail maintenance, and critical conservation reasons. If the requested preliminary injunction is issued, the Center would be unable to manage access for these critical events. These include:

- Protection of the federally threatened Coastal California Gnatcatcher: occasionally during gnatcatcher breeding season (Feb. 15 - Aug. 31), CNLM may need to close part or all of the trail to protect the nests, for up to six weeks depending on the age of and activity in the nest. CNLM's experience has been that if it only closes part of the trail, people either take down our fencing or step over it, so it really is necessary to completely close the trail.
- Vegetation management to protect Pacific pocket mouse habitat: Once per year, the Center closes the trail to remove dead and downed vegetation. This takes approximately five days. The work can only be done November through January, outside of PPM breeding season.
- Trail maintenance after rain: After it rains, there is typically pooling and erosion on the trail. CNLM must close the trail for approximately three days (or more, depending on the weather event) to allow the trail to dry out and appropriate maintenance to occur, for safety reasons, and for PPM protection (i.e., when the sand is saturated and people go off-trail, there is a greater impact on PPM).
- Other trail and infrastructure maintenance: the Center occasionally needs to close the trail to fix ruts in the trail for public safety, to fix fences, to paint fixtures, etc.

- Public outreach/education events: It may be necessary to restrict access to avoid over-crowding on the trail during such events.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on this 6th day of September, 2022, at Hercules, California.

DL Rogers

DEBORAH L. ROGERS

5185375.4

EXHIBIT 1

COOPERATIVE AGREEMENT
BETWEEN CENTER FOR NATURAL LANDS MANAGEMENT
AND THE U.S. NAVY
COOPERATIVE AGREEMENT NUMBER
N62473-20-2-0018

September 2020

1. Introduction: This Cooperative Agreement is made by and between Center for Natural Lands Management (CNLM) and the Department of the Navy (DON). It is issued to:

Center for Natural Lands Management
Attn: Dr. Deborah L. Rogers
27285 Via Industria, Suite B
Temecula, California 92590
CAGE Code: 3J4C4

2. Purpose: CNLM shall use this Cooperative Agreement to develop and implement the Dana Point Preserve Pacific Pocket Mouse Enhanced Management Plan (EMP). CNLM will use the cooperative agreement funds, in compliance with enclosure (1), Terms and Conditions, to carry out the project further described by enclosure (2), Statement of Work (SOW).

3. Authorities: The authority for this Cooperative Agreement is 16 USC §670c-1 (Natural Resources Management - Sikes Act).

4. Period of Performance: The period of performance will be thirty-six (36) months from the date of award. The end date is the anticipated date that the final report is accepted by the U.S. Government. However, the parties may extend the period of the Cooperative Agreement by written modification. The total duration of this Cooperative Agreement, including any modifications shall not exceed 60 months.

5. Funding: The total obligated for this Cooperative Agreement is $826,000

6. Accounting and Appropriations Data:

ACRN	APPROP	SUBHEAD	OBJ CLS	BUR CONT.	SUB ALLOT	AUTH ACCTG ACTY	TRANS TYPE	PROP ACCTG ACTY	COST CODE/ JOB ORDER	AMOUNT
AA	9700100	1100	0254			012215	2I	HQ0642	044026	$826,000

6a. Information below is provided to provide internal Government information for the purpose of obligation and invoicing. MIPR (HQ0642044026) is associated with this Cooperative Agreement.

LINE /DIST NUM	ACRN	SUPPLEMENTAL ACCOUNTING CLASSIFICATION	FUNDED AMOUNT
0001/1	AA	^^^097^2020^2020^^0100^000^^254^D^4GTN^^^^^1100^00008522^012215^USAS^OSD - DUSD (INST^USAS_2588^20_0100D_0903399^254.21 O&M Real^^^	$826,000.00

7. Awarding Office:

Naval Facilities Engineering Command, Southwest
1220 Pacific Highway
San Diego, CA 92132

8. Cooperative Agreement Administrative Office / Representative:

Kellie Wilson
Naval Facilities Engineering Command, Southwest
Code ACQ4
1220 Pacific Highway
San Diego, CA 92132-5190
(619) 532-2090
E-mail address: kellie.wilson@navy.mil

9. Paying Office:

DFAS- Cleveland, Norfolk Accounts Payable
1240 E. 9th Street
Cleveland, OH 44199
See Statement of Work for Wide Area Work Flow (WAWF) Payment Instructions

10. Delegations: Full administration duties have been delegated to the administrative office (paragraph 8). Upon request the awarding office (paragraph 7) will make the full text of delegated contract administration functions available. Please direct questions to those contacts.

11. Terms and Conditions: Additional Cooperative Agreement terms and conditions are provided at enclosure (1).

12. Signature of representative for Center for Natural Lands Management

DL Rogers
______________________________________ ____09/16/2020________________

Dr. Deborah L. Rogers DATE
Co-Executive Director
Center for Natural Lands Management

13. For the United States of America: Signature of awarding Grants Officer.

______________________________________ ___________________

Edward Chevalier DATE
Director, Capital Improvements, Acquisition Core
Naval Facilities Engineering Command, Southwest

EXHIBIT 2

Dana Point Preserve (S033) Pacific Pocket Mouse Enhancement Management Plan

2020-2030

Prepared by:	Korie C. Merrill Preserve Manager, Orange County Center for Natural Lands Management
	Deborah L. Rogers Director of Conservation Science and Stewardship Center for Natural Lands Management
With input and review by:	Cheryl Brehme US Geological Survey
Provided for review to:	US Fish and Wildlife Service, Carlsbad Office
	US Marine Corps Base, Camp Pendleton

INTRODUCTION

1.0 PPM Status and Extant Range

The Center for Natural Lands Management (CNLM), a nonprofit organization, owns and manages the approximately 12 ha (~29 ac) Dana Point Preserve ("Preserve") in Orange County, California, that is occupied by one of the only three extant (natural) occurrences of the endangered Pacific pocket mouse (*Perognathus longimembris pacificus* [Heteromyidae]; PPM). The Dana Point PPM population is the only naturally occurring PPM population outside of the Marine Corps Base Camp Pendleton (MCBCP, Figure 1). CNLM owns and manages the Preserve with the primary goal of maintaining the federally protected PPM and coastal California gnatcatcher (*Polioptila californica californica*) and the associated appropriate habitat. The PPM population at Dana Point is protected through restrictions on the (CNLM) acquisition and a conservation easement held by the City of Dana Point (City). In 1995, two populations at three locations of PPM were found on MCBCP: North San Mateo, South San Mateo, and Santa Margarita (USFWS 1998, 2010; Brehme et al. 2018); however, the PPM occurrence at North San Mateo is presumed to be extirpated with no PPM detected since 2003 (USFWS 2010; Brehme et al. 2018). The Santa Margarita (SM) PPM population is the largest (USFWS 1998) and thus predictably has the most genetic diversity of the three extant populations (Wilder et al. 2020). The SM area is also an active training site with training-related impacts documented in the past and likely to continue to occur; thus the U.S. Fish and Wildlife Service (USFWS) supported the decision of U.S. Marine Corps to receive regulatory relief for funding enhancement management for PPM at Dana Point Preserve to offset the potential negative effects of these activities on the species (USFWS 2020).

PPM is one of 16 subspecies of *P. longimembris* (USFWS 2010) and was thought to be extinct from the 1970s until being discovered in what is now the Preserve in 1993 (Brylski 1993). It was federally listed as endangered by the USFWS in 1994 and has also been listed as a Species of Special Concern by the California Department of Fish and Wildlife (CDFW).

2.0 PPM Recovery and Adaptive Management Plans

A Pacific Pocket Mouse Recovery Plan ("Recovery Plan") was written in 1998 with the objective to delist the subspecies and with an interim criterion to reclassify it as threatened. One of the top priorities of the Recovery Plan is to maintain and protect extant populations; to do this, it was determined that more research and subsequent management would be required to prevent extirpation through adaptive management, and in part the enhancement of current PPM habitat (USFWS 1998). Prior to the acquisition of the Preserve by CNLM, URS Corporation prepared a Habitat Management and Monitoring Plan (HMMP; 2005) for the Dana Point Headlands Biological Open Space—a term that included both the area that is now the CNLM Dana Point Preserve, as well as approximately 20 additional acres of City-owned property. The HMMP was reviewed by the California Coastal Commission (CCC), USFWS, CDFW, and the City. CNLM has been managing the Preserve according to the 2005 HMMP until an updated version is finalized. A Dana Point Preserve-specific Habitat Management Plan (HMP) is currently under revision by CNLM. More information is provided in Section 5 on how the HMP and this Dana Point Preserve Pacific Pocket Mouse Enhancement Management Plan (Enhancement Management Plan, EMP) are complimentary. Both plans and associated management activities support the following strategies in congruence with the USFWS Recovery Plan (USFWS 1998):

- Protect the Dana Point population in perpetuity
- Bolster the health of the population with long-term solutions that promote self-sustainability and full ecosystem functionality
- Implement management plans that are adaptable to fit the needs of PPM as they arise.

3.0 Readiness and Environmental Protection Integration (REPI) Program Funds

Although there are perpetual, endowment-based, financial resources for management of PPM and other natural resources at the Preserve, they are insufficient to provide the full management, monitoring, threat reduction, analysis, and adaptive management needed to optimize the persistence of this valuable extant population in perpetuity. The primary means by which enhanced management on the Preserve will occur is through increased CNLM staff time dedicated to both onsite and related off-site activities.

PPM-focused enhanced management on the Preserve will be conducted using funds provided by the U.S. Marine Corps through the Readiness and Environmental Protection Integration (REPI) program (USFWS 2020). Enhanced management will be focused on the more suitable areas of the Preserve—i.e., areas with suitable geomorphology (e.g., slopes less than 15%) rather than expend resources in areas not likely to sustain PPM such as steep cliff faces of Coastal Bluff Scrub. Within the Preserve, this focal area is approximately 8 ha (20 ac, Figure 2) of mature Coastal Sage Scrub (CSS) vegetation with slopes less than 15% and sandy soils.

4.0 Enhancement Activities

The specific conservation goals for the EMP are based on general management principles that emphasize sustainability while recognizing natural variability in climate and ecological processes. Implementation of this EMP will incorporate adaptive management processes and result in:

- Assessment of current vegetative/open space conditions on the preserve
- Direct interventions to bring the vegetative/open space into the range of vegetation conditions that are currently considered appropriate for PPM (Table 1)
- Continued maintenance of the conditions to stay within this range or the revised range (Table 2) based on site-specific experience and data, as well as other scientific resources
- Monitoring the general effects of habitat manipulation
- PPM threat evaluation and reduction
- Integration of the HMP and EMP management and monitoring efforts
- Reporting of these activities.

Enhanced management for PPM on the Preserve will be based on relevant scientific principles and paradigms, and current science-based information from CNLM, USFWS, and other experts in the field (e.g. USGS and San Diego Zoo Global). Depending on annual variation of on-site conditions, available information, and planned frequencies, all or some of the activities will be accomplished each year.

5.0 Integration with CNLM's Preserve Habitat Management Plan

As a separate activity, but contemporaneous with the development of the EMP, the general Preserve-wide HMP is being drafted and is expected to be simultaneously implemented, replacing the 2005 HMMP. The HMP describes in detail the background of the Preserve, the habitat and species managed, and management goals and strategies for the Preserve. The HMP outlines management for PPM as is reasonable with the current endowment. Strategies for PPM management on the Dana Point Preserve are listed on page 4.

Thus, strategies for PPM management under the in-process general management plan (HMP) for the Preserve provide a supportive frame for enhancement activities. Although specific activities associated with those strategies will not be described here, information and experience from those activities will aide in the implementation of the EMP, and vice-versa (e.g., annual monitoring of PPM as part of the HMP will provide data useful for planning vegetation manipulation and data from vegetation thinning will be useful in analyzing trends in PPM dispersal, localized colonization, and extinction events.) Both plans (HMP and EMP) have been written to support the other but will remain separate documents and there will be two separate endowments for management activities.

General goals to be achieved for PPM at Dana Point Preserve

HMP	EMP
• Monitor and evaluate PPM population size and area of occupancy variation over time e.g., annual track tube monitoring and live trapping approximately every 3 – 5 years.	• Assess PPM population response to enhanced management activities at Dana Point Preserve e.g., use data collected to analyze PPM response to management activities, model Dana Point PPM suitable habitat
• Determine health and reproductive activity of PPM e.g., live trapping approximately every 3 – 5 years.	• Implement an adaptive monitoring program within the Dana Point Preserve e.g., use remote sensing technology to monitor habitat and vegetation, and integrate PPM population and size and area occupied to model suitable habitat
• Evaluate the structure and composition of the CSS habitat through long-term transects e.g., monitor permanent vegetation transects on a staggered rotating schedule	• Evaluate and monitor the structure, composition, health, and suitability of habitat for PPM on the Preserve e.g., use remote sensing technology to monitor habitat and vegetation, collect and monitor vegetation health over time to potentially track climate change responses on the Preserve
• Maintain suitable conditions for PPM foraging, breeding and dispersal e.g., manage invasive species, conduct duff removal, remove trash or debris, maintain structural protects, etc.	• Enhance habitat to increase suitability for the PPM Population within the Dana Point Preserve e.g., implement vegetation thinning, duff removal, seeding, and planting towards maintain or increasing suitable habitat based on current science and information obtained during the adaptive monitoring program.
• Minimize threats to PPM productivity e.g., reduce likelihood of excessive predation; minimize impacts from illegal trespass onto the Preserve.	• Provide enhanced protection for the PPM Population within Dana Point Preserve e.g. increase patrols and public outreach opportunities.
• Monitor and evaluate PPM population size and area of occupancy variation over time e.g., track tube every year, live trapping approximately every 3 – 5 years. • Manage genetic diversity indirectly through supporting population size and reproductive processes.	

ENHANCED VEGETATION MANAGEMENT AND MONITORING OF THE PRESERVE FOR THE BENEFIT OF PPM

1.0 Scientific Guidance

The purpose of enhanced monitoring is to augment current practices of track-tube and live-trap monitoring, as appropriate (CNLM 2020, in prep). For example, REPI funds will allow for CNLM to analyze data from these monitoring methods in relation to habitat manipulation more fully than what is current practice. In addition, more monitoring of habitat conditions (such as soil moisture, erosion, plant health and habitat structure) could be conducted using remote sensing technology (e.g., aerial imagery, normalized difference vegetation index (NDVI), and digital surface models). Information and experience from other PPM land managers and researchers, as well as information on historical conditions, will be incorporated into CNLM analyses when applicable and available.

CNLM's management framework is driven by scientific and legal guidance. Scientific principles are integrated through risk-assessment and calibration of appropriate management (including monitoring and restoration) practices. This is the process by which existing management methods, with their foundation in science, are tested (for efficacy and risk) and calibrated for the appropriate scale and context of our preserves and populations. These calibrations and risk assessments are an ongoing part of CNLM management within the Preserve. They may be framed as adaptive management or applied research, depending on the specific topic, experimental design required, and often, whether there is an additional funding source. In either case, the objective is to continually practice adaptive management and accumulate knowledge that will further our conservation objectives. This framework will be implemented throughout this EMP and associated management activities.

2.0 Enhanced Vegetation Management and Monitoring

2.1 Roles of Vegetation for PPM

Vegetation is one of the most critical and manageable components of appropriate habitat conditions for PPM persistence — with climate, catastrophic events, and edge and fragmentation effects being highly influential on PPM persistence but much less manageable. Although precise prescriptions for types, amounts, and spatial distribution of vegetation that best serve PPM needs have not been developed, would reasonably change over time, and may be somewhat site-specific, some information is emerging from PPM studies (e.g., Brehme et al. 2014) that provides general guidance for vegetation management (e.g., Table 1). Logically, vegetation management can be approached by considering the specific roles that different kinds of vegetation (and bare ground) play in the life cycle of PPM (e.g., Table 2). These can include food (encompassing nutrition, palatability, seasonal availability, storability, etc.), physical protection (plant effects on soil structure for burrow suitability, protection of burrow entrances, cover from predators, etc.), moderating effects on microclimate (directly for PPM, indirectly for other species), and social/reproductive interactions. That is, vegetation is managed for multiple purposes that collectively support PPM.

2.2 Current Vegetation Management Focus

Thinning of vegetation has been part of the habitat management of the Preserve since 2005 (URS 2005; CNLM 2020, in prep.). Vegetation trimming currently occurs at least twice annually on the Preserve along the public trail, resulting in approximately 0.1 ha of open bare sand. It is unclear as to what extent this area is used by PPM. Additionally, various vegetation thinning efforts have been implemented since 1999. With the help of volunteer groups (see CNLM 2014) or contractors who specialize in native habitat restoration (see CNLM 2019), CNLM has been able to create more open patches by removing dead and downed plant material to improve or provide PPM habitat; however, the frequency and the amount of area thinned has been limited by available resources (i.e. time and funds). Further, annual management activities and funding may be insufficient to address cumulative or atypical conditions or events. For instance, an average or above-average rain year followed by prolonged periods of drought can result in accumulation of dead shrubs, leaf litter or invasive plants that the average annual budget would be insufficient to address in full. During past management activities, small patches, typically designated by a PPM monitoring grid cell (24m x 24m, 0.0576 ha), were thinned but at a high resource cost. For example, CNLM hired contractors in 2018 and 2019 to remove dead and downed vegetation within the Preserve, with varying baseline conditions crews of 4 people were able to remove dead and downed vegetation combined with a low level of raking duff at a rate of 30-60 m^2 per labor hour (approximately 0.072-0.144 ha per day). That level of extreme effort — burrow surveys and avoidance, removal of material by hand, the amount of vegetation needed to be removed and debris deposition— was not anticipated during the initial (2004) budget calculations. As such, enhanced funding will provide an opportunity to address some of these atypical conditions (or the ‘new normal’) as they arise.

When appropriate, vegetation will be manipulated to create the most suitable habitat conditions for PPM on the Preserve. Vegetation manipulation would likely center around maintaining suitable habitat in areas where PPM are known to occur within the Preserve, then radiating out to new areas for treatment. Consideration would also be given to treatment in areas that would benefit most (i.e., use of enhancement funds to ‘best effect’). The amount of area treated would vary from year to year towards a target range of 0.2 – 2.0 ha (~ 0.5 – 5 acres); however, it is anticipated that, on average, 0.4 ha (~ 1 acre) of vegetation will be manipulated per year over three years. As part of the EMP, a five-year vegetation management plan will be developed and implemented to guide when and how vegetation manipulation will be implemented. With that five-year plan as guidance, the specific location, effort, and goal for manipulation will be determined annually based on analysis and interpretation of information collected under the HMP and EMP and will be presented in annual work plans.

2.3 Challenges of Demonstrating Cause-effect Relationships

In natural or wild conditions there are multiple variables that lend to or mask and confound attempts to show causal relationships. Although monitoring of both PPM and vegetation over time will continue to provide information on general habitat suitability, there is inherent difficulty in showing a direct cause-effect relationship between vegetation management and PPM population size on the Dana Point Preserve. Designing an effective *in situ* experimental framework to make a strong causal connection is improbable. The small and constrained size of the available habitat (the Preserve has a hard edge except the eastern edge adjacent to the City preserve), the small population size of PPM within the Preserve (thus limiting the ‘response variable’), and the range of confounding variables all limit what inference can be made from an experimental framework. These factors also limit the number of 'vegetation treatments' that could be compared in a study and hence quantification of relationship. Further, because of the imperial nature of this population and habitat it is imperative that we manage for the best possible affect rather than intentionally suboptimal management (i.e., vegetation treatments) solely based on experimental design to control for variables. Previous CNLM on-site experiments have attempted to elucidate the relationship between PPM dispersal and vegetation thinning— specifically, whether PPM expand into previously uncolonized areas from colonized habitat after thinning. With the general goal of determining whether creation of more bare ground (relative to baseline conditions) affected PPM dispersal, pilot studies were conducted in 1999-2000, 2008-2009, and 2013-2014 (Dodd and Montgomery 2001; CNLM 2010, 2014; respectively). All three studies included only one treatment (i.e., increase the amount of open space by reducing shrub and ground cover) but were different in other respects and thus not comparable in the summary of results. They differed in in the methods for distinguishing plot size, monitoring PPM (e.g., trap effort), the amount of vegetation removed (e.g., live or dead vegetation removed, or just duff removal), and spatial relationship between control and treatment plots with respect to PPM presence (i.e., detected or not detected the year of treatment). Results differed among years, were not comparable in any event as they were asking different questions and were substantially influenced by confounding variables. While these studies provide insight to understanding experimental factors associated with habitat management, they also demonstrate the difficulty in designing and executing an experimental framework for quantifying PPM response to vegetation management *in situ*.

Considerations concerning the complexity of studying the relationship between PPM and vegetation include the following:

1. Difficulty of demonstrating cause-effect relationship between PPM and vegetation conditions and how to interpret correlations
2. What is a meaningful and measurable response variable (e.g., PPM population size, dispersal rate, area occupied) for management activities (in this case, vegetation thinning)?
3. What lag effect would be expected between treatment and effect relative to each potential response variable (e.g., dispersal, demographic structure, population size)
4. Constraints of available space/habitat and number of PPM on experimental design (e.g., number of treatments, replicates, and sample size)
5. Impact of confounding factors
6. Any relationship (cause-effect or correlation) may be expected to change over time (i.e., not a one-time determination) in part because the nature of the population may shift over time, changing life-history characteristics and rates

From these questions and considerations we can draw some conclusions: Confounding factors such as the limited size of the Preserve, stochasticity of PPM populations, competition, resource availability, public use within the Preserve, and weather patterns are all likely to influence PPM population size, dispersal, and response to management activities and are all variables not easily addressed or controlled in simple *in situ* experiments. For example, the size of the Preserve limits the ability to replicate treatments (lowering confidence in results) and limits the design to categorical (thinned or not thinned) rather than quantitative.

<u>2.4 Value of Long-term Monitoring and Analysis</u>

The most appropriate means of approaching better understanding of the relationship between vegetation and PPM is through long-term monitoring (spanning significant ranges in potential predictor variables) and use of modelling. Building on the foundation provided by principles of population biology, risk management, and current results of modelling from available PPM data (Table 1), more preserve-specific data will contribute towards more helpful vegetation management guidelines to achieve the most suitable conditions for PPM on the Preserve (e.g., Table 2).

Enhanced management of PPM on the Preserve will use monitoring data conducted under the HMP in combination with this EMP such as: increased use of wildlife cameras, remote sensing, and specific PPM monitoring point vegetation monitoring to be used for habitat modeling (e.g., this would follow Brehme et al. 2016 protocols).

Risk management includes not only avoidance of harm to PPM from management, monitoring, or other activities but avoidance of over-interpretation of short-term results. Caution should be taken in inferring population expansion or dispersal as a direct result from vegetation thinning (Brylski et al. 2009). Interpretation of results will be carefully done to infer dispersal, occupancy, vegetation conditions and preferred PPM habitat, not necessarily treatment effect. Monitoring should be conducted to get a sense of negative impacts from management activities, evaluate the general patterns of the population and provide indications of population declines or increases which can be teased out from long-term studies. Thus, adaptive management and science-based monitoring will be implemented to provide a feedback loop to better understand the highly dynamic interaction between PPM and vegetation interventions. Specific enhanced PPM vegetation monitoring will be conducted at 8-10 permanent track-tube monitoring points to be used for habitat modeling following Brehme et al. 2016 protocols at a spatial distance of 0.0576 ha. Monitoring data, when appropriate, will be shared with the USFWS, the Marine Corps and other research partners to aid in understanding suitable PPM habitat.

3.0 Threat Reduction

3.1 Risk Management

Protection of the extant PPM populations is the top priority for recovery of the species. Under guidance from the current HMMP (and the revised HMP), CNLM staff monitor Preserve conditions during management activities and document changes in plant health and vigor, trends and relationships with vegetation and climate, and presence and new observations of invasive plants and animals.

For all activities, the level of impact and the frequency are assessed as risk. As such, methods should be reviewed and revised as necessary to reduce impacts. As new innovations and technology become available monitoring and management activities should implement less impactful methods where possible. A current example for PPM management would be the use of track tubes for monitoring PPM occupancy rather than live-trap monitoring which has reduced the direct (mortalities) and indirect (vegetation destruction) impacts to PPM. It should be noted that CNLM implements protocols to reduce the likelihood of incidental take of PPM to negligible when conducting management (including monitoring) activities. These protocols are based on best practices and most recent scientific knowledge. Current best management practices for vegetation management and monitoring include:

- Flagging trails to and from the area of work
- Oversight of activities by qualified biologists
- Conducting surveys to find and flag PPM burrows to be avoided
- Delineating the area of work prior to activity
- Removal of dead and disarticulated material as a first priority
- Minimization of soil disturbance: if an individual plant needs to be removed and would cause soil disturbance then that plant will be cut at the base rather than being pulled. This falls under the "two-finger test" which is when a person can move a piece of vegetation easily with two fingers but if it takes more force than that, the vegetation is left, cut into smaller pieces or cut the base and removed- duff is raked and removed and all vegetation and duff debris is hauled out of the area of work.

Currently, CNLM has a Section 10(a)(1)(A) permit for PPM track-tube monitoring (USFWS 2019). It was issued to allow for take as part of activities intended to foster the recovery of listed species. Other management activities are not anticipated to adversely affect PPM and are conducted for information gain (research) or enhancement.

3.2 Public Use

Preserve management tasks also include addressing trespass, vandalism, and impacts from predators (e.g., red fox, long-tailed weasel, and domestic animals). Likely predation pressure from native and non-native species exist, however concerns of impact from public use, trespass, domestic animals, and trail use are a focus of concern at this time. Due to the increased number of visitors and subsequently the increase in off-trail use and dogs on trial the current HMP doesn't allow for proper management of these threats. For example this EMP would increase the presence of CNLM staff on site and the ability to coordinate with the local law enforcement entities (Orange County Sheriff's Department (OCSD), City of Dana Point, and CDFW) to enforce and prevent trespass and or wildlife harassment issues associated with public use of the Preserve and adjacent open space owned by the City.

5.0 Management Goals, Strategies, and Objectives

Implementation of this EMP will focus on the following goals and objectives.

(i) **Goal**: Provide enhanced protection for the PPM Population within Dana Point Preserve

Strategy 1: Reduce public trespass within the Preserve

Objective 1.1: Increase the onsite presence of CNLM by up to 40 hours per year to educate trail users on the ecological importance of the area and to minimize impacts from the public on the Preserve

Objective 1.2: Collaborate with local enforcement entities to help in protecting the Preserve

Strategy 2: Maximize the sustainability of PPM through augmented threat reduction and research

Objective 2.1: Collaborate with land managers and other experts to implement threat reduction strategies based on site-specific experience and data, as well as other scientific resources

(ii) **Goal**: Enhance habitat suitability for PPM within the Dana Point Preserve (Figure 2) using an adaptive management approach to study and improve the effectiveness of vegetation and ground cover composition recommendations (e.g., Brehme et al. 2014) or best available science for improving PPM habitat suitability

Strategy 1: Develop a specific five-year Dana Point Preserve vegetation management plan

Objective 1.1: Develop the process for systematically determining annual management activities related to vegetation manipulation and monitoring

Objective 1.2: Provide protocols for vegetation management methods, implementation, and rationale

Objective 1.3: Provide protocols for vegetation monitoring methods, implementation, and rationale

Objective 1.4: Provide protocols for PPM response monitoring methods, implementation, and rationale

Objective 1.5: Evaluate the five-year Dana Point Preserve vegetation management plan and apply adaptive management approach as appropriate.

Strategy 2: Minimize the possibility of PPM take during enhanced monitoring and management activities

Objective 2.1: Implement current CNLM prevention protocols (listed above in this plan and in the HMP)

Objective 2.2: Use an adaptive management approach that pairs monitoring with management to provide feedback on management and monitoring activities

Strategy 3: Manipulate the structure and composition of the vegetation to enhance habitat suitability PPM on average 0.4 ha (~ 1 acre) annually

Objective 3.1: Based on most recent science and the five-year Dana Point Preserve vegetation management plan (see Strategy 1) determine areas for enhanced vegetation management activities

Objective 3.2: Use physical trimming and removal of vegetation (may include removal of living and dead vegetation and duff and woody debris) as appropriate

Objective 3.3: Selectively apply herbicides to help enhance habitat suitability for PPM as appropriate

Objective 3.4: Implement planting, and seeding forbs known to be part of PPM diet as needed and appropriate

Strategy 4: Practice adaptive management (assess relationship between PPM presence and habitat condition)

Objective 4.1: Enhance our knowledge of PPM activity on the Preserve with the use of wildlife cameras in addition to the annual track-tube monitoring and live trap monitoring data collected under the HMP

Objective 4.2: To the extent feasible, apply appropriate experimental frames to monitoring and vegetation management, to better understand relationship between habitat conditions and habitat use by PPM

Objective 4.3: In collaboration with other PPM experts, periodically assess PPM preferred habitat attributes and food sources (e.g., Table 1) and update targets for preferred habitat conditions as needed

6.0 Monitoring Goals, Strategies, and Objectives

(i) **Goal**: Monitor PPM population response to enhanced management activities within the Dana Point Preserve while minimizing the impact of monitoring on the habitat and PPM

Strategy 1: Look for evidence of PPM response to management activities on Dana Point Preserve using six wildlife cameras, data collected during annual track-tube PPM monitoring, vegetation surveys, and live-trap PPM monitoring (which occurs every 3 – 5 years on average, or as appropriate, as part of the HMP)

Objective 1.1: Monitor PPM presence with two additional track tubes and wildlife cameras per grid cell (0.0576 ha) in areas planned for enhanced vegetation management activities in advance of the current year and post treatment for two years. Details of placement and duration will be described in the annual work plans (Note: Additional—beyond HMP frequency—live-trap monitoring could be used in lieu of other monitoring activities if appropriate to reach monitoring objectives)

Objective 1.2: Develop a plan for appropriate analysis of monitoring and management data (e.g., statistical tests, spatial analysis, and visual representations)

Objective 1.3: Conduct appropriate analysis of data from long-term and annual monitoring from the HMP and EMP to study the efficacy of management practices conducted under the EMP

Objective 1.4: Carefully interpret data within the appropriate context of PPM response to management activities

(ii) **Goal**: Improve the understanding of habitat and PPM relationship within the Dana Point Preserve

Strategy 1: Evaluate and monitor the structure, composition, health, and suitability of habitat for PPM on the Preserve

Objective 1.1: Monitor the health and changes in the structure and composition of Preserve vegetation using appropriate remote sensing technologies every three years (such as NDVI)

Objective 1.2: Conduct additional PPM vegetation monitoring in the enhanced vegetation management grids in advance of the current year and post treatment for two years, at the same locations as the additional PPM track tubes, to collect habitat covariates following Brehme et al. 2016 protocols

Objective 1.3: Analyze changes in the structure and composition of habitat throughout the Preserve annually (e.g., use data CNLM's long-term CSS monitoring transects and 8-10 permanent monitoring points)

Objective 1.4: Carefully interpret data to determine a baseline index of structure, composition, health, and suitability of habitat for PPM on the Preserve and update targets (e.g., table 2) for preferred habitat conditions every 3 – 5 years or as needed (such as habitat models, and spatial visualization)

(iii) **Goal**: Monitor for additional threats to PPM on Dana Point Preserve not addressed in the HMP (e.g. anthropogenic effects, introduced species, resource competition, etc.)

Strategy 1: Collaborate with land managers and other experts to implement threat reduction strategies based on site-specific experience and data, as well as other scientific resources

Objective 1.1: Participate up to 12 hours per year of relevant working group meetings, regional meetings, conferences, and training opportunities

Objective 1.2: Work with the City to soften the "hard edges" of the Preserve adjacent to City owned property to expand suitable habitat across the preserved landscape

7.0 Planning and Reporting Goals, Strategies, and Objectives

(i) **Goal:** Plan and document the implementation of the EMP

Strategy 1: Manage the budget and prepare and provide plans and reports to USFWS and USMC that serve the EMP

Objective1.1: Determine and manage the annual EMP budget accordingly

Objective1.2: Prepare and provide an annual work plan

Objective1.3: Prepare and provide annual summary report with a target date no later than 1 February

Objective1.4: Provide an endowment status financial report with a target date no later than 1 February

A concise representation (short form) of all the objectives for each management, protection, monitoring, or planning/reporting goal, along with frequency, is presented in Table 3.

8.0 Plans and Reports

The EMP has been written to offer robust, long-term guidance to optimize the use of regulatory relief funds provided by U.S. Marine Corps for enhanced management. Routine monitoring and management objectives described are intended to help ensure PPM health and persistence in perpetuity. Annual work plans will be prepared by CNLM as a separate section of the general preserve annual work plan. The annual work plan will provide a description of general activities for the upcoming fiscal year (Oct 1 – Sept 30), and may differ from year-to year as some activities are not annual, and will provide opportunities to make valuable adjustments in the ten-year EMP as indicated by current conditions (i.e., work plans are part of the adaptive management process). These plans will be provided to CDFW, USFWS, and U.S. Marine Corps for the purpose of soliciting input. Annual budgets for the upcoming fiscal year will be prepared by CNLM and will be based on funding from REPI Funds. Annual reports will be prepared by CNLM and will be completed near the beginning of the new calendar year, with a target date no later than 1 February, for the previous fiscal year (October- September). The EMP annual report will be included as an attachment to CNLM's Dana Point Preserve report provided to CDFW, USFWS and U.S. Marine Corps. Annual financial reports will be prepared by CNLM and provided to USFWS and the U.S. Marine Corps with a target date no later than 1 February for the previous fiscal year (October- September).

9.0 Enhanced Management Plan Revisions

The EMP will be reviewed and updated, as appropriate, every ten years – CNLM will invite USFWS and the U.S. Marine Corps to review and comment on the revised plan. Revisions to the EMP may be prompted by a desire to improve the management and monitoring program, by significant changes in habitat conditions within the Preserve, or changes in the status of PPM that would trigger activities that are substantially unanticipated or unaddressed by the current EMP. Should the PPM population become extirpated, CNLM will work with the USFWS and other experts to evaluate the presumed cause(s) and determine the best course of action at that time.

FUNDING REQUIREMENTS AND MANAGEMENT

Financial resources required for this plan have been based on increasing the capacity of the CNLM Preserve Manager to dedicate to these activities—which require planning, assessments, analysis, reporting, and on-the-ground activity. Increasing capacity by 0.20 FTE would require approximately $728,000 in perpetual funding (restricted as an endowment) and an additional $98,000 for three years of operating funds while the endowment matures.

CNLM shall keep accurate records that specify costs and expenses with this fund, including both the operating funds and endowment. The endowment will be managed separately than the Preserve endowment, in a manner to preserve the perpetual funding source for the long-term management tasks set forth in this plan specifically.

FIGURES AND TABLES

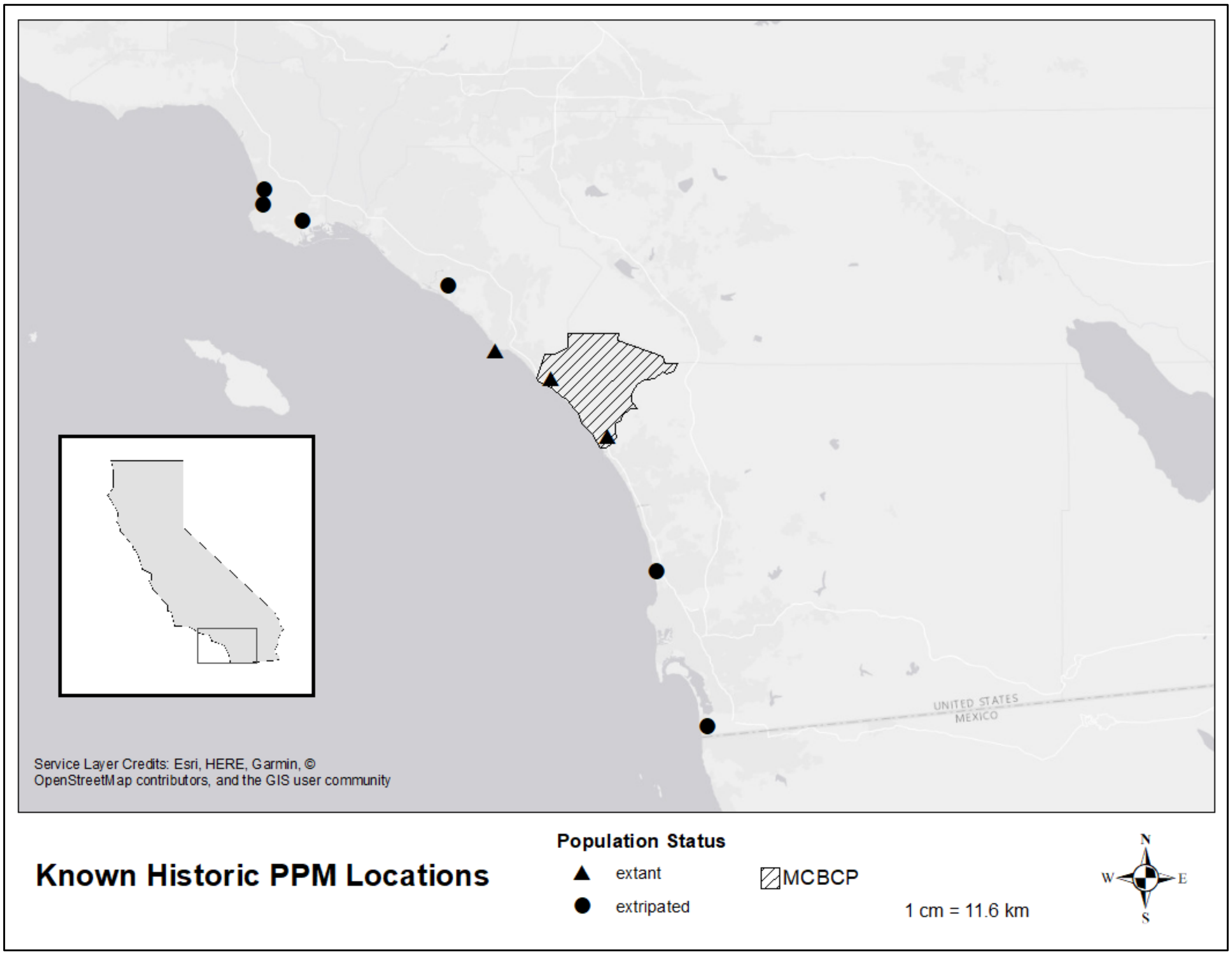

Figure 1. Map of recorded historic PPM populations (Adapted from USFWS 1998).

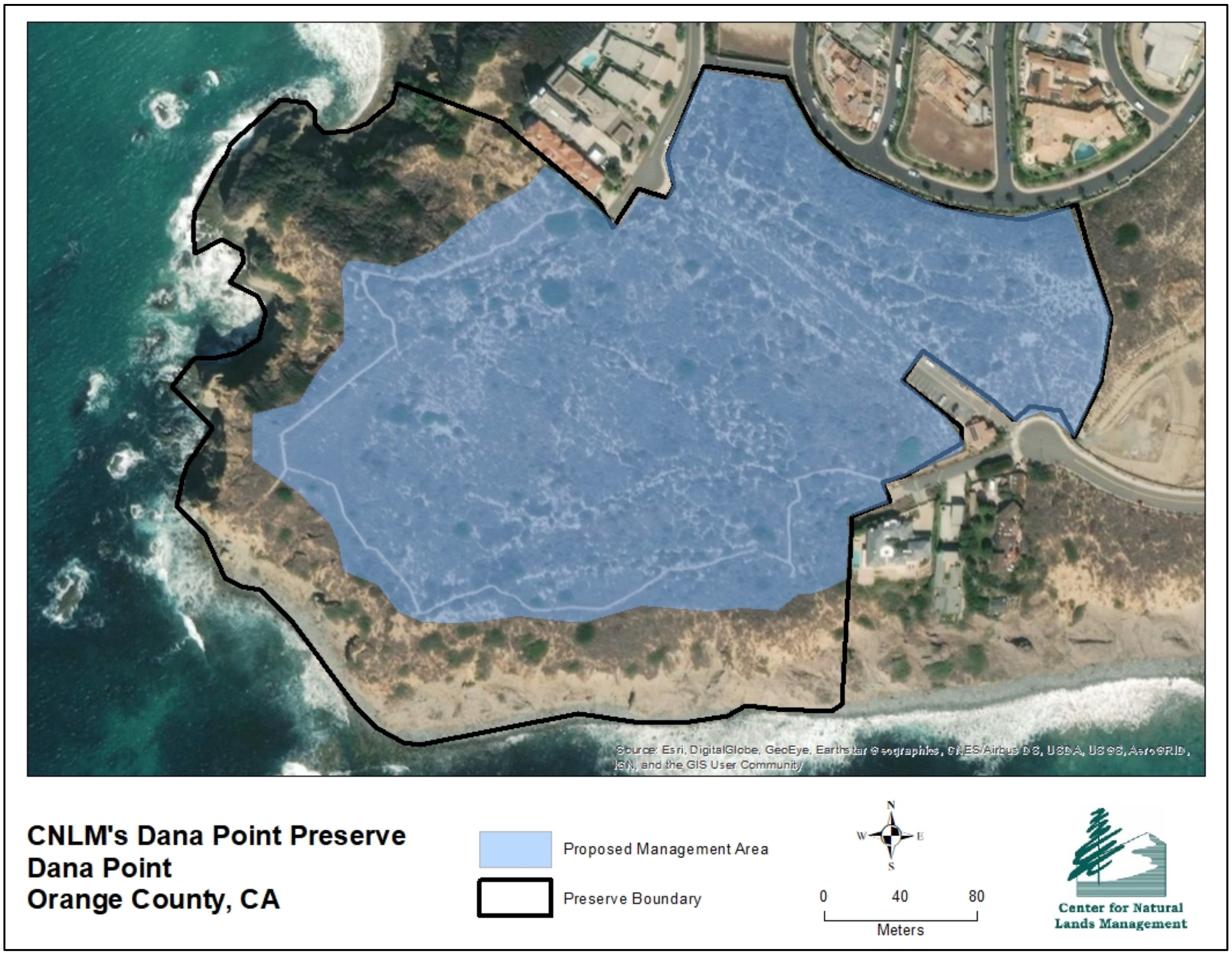

Figure 2. Area of performance (blue shading) within Dana Point Preserve (black outline).

Table 1. Current understanding of PPM habitat management goals by functional group (Brehme et al. 2014).

Cover Type	Goal (%)	Acceptable Range (%)
Forbs	60	< 35
Perennial	20	> 10
Annual	40	> 25
Open Ground	20	15-50
Native Grass	15	10-40
Non-native Grass	0	< 15
Shrubs	5	< 15
Woody Debris	0	< 15

Table 2. Vegetation management guidelines for Dana Point Preserve, based on Brehme et al. 2014.

Functional group	Purpose	Components	Current desirable target range
Cover and perennial food sources	Microclimate moderation, burrow/soil stability, microsite influence for other plants, protection from predators, food	(Living) shrubs, subshrubs, perennial grasses	20-50%
Annual food sources	Early season food	Forbs	20-30%
	Late season food	Annual grasses	5-10%
Cover[1]	Protection from predators, burrow entrance protection, some microclimate moderation	Woody, dead material	10-20%
Open space	Social/reproductive interactions, food collections, baths, etc.	Bare ground	15-40%

[1]More desirable to be standing material covering bare ground (rather than duff, or thatch) and loosely arranged (rather than heavy, dense concentrations).

Table 3. Reference table for EMP goals with frequency.

Goal	Objectives	Frequency
Protection	Increase on site presence and patrols	Up to 40 hours annually
	Collaborate with local enforcement authorities	As needed
	Implement threat reduction strategies	Up to 20 hours annually
Enhance PPM Habitat Suitability	Develop a specific vegetation management 5 -year plan	Completed in the first year, then updated as needed
	Implement the 5-year management plan	Annually after the second year
	Minimize management and monitoring risk	As needed
	Apply an adaptive management approach	As needed
	Manipulate an average of 0.4 ha (~ 1 ac) of habitat	Annually
	Enhance our knowledge of PPM activity on the Preserve	Annually
	Collaborate with other PPM experts to update targets for preferred habitat conditions	Every 3-5 years or as needed
	Evaluate the 5-year management plan	Every 5 years or as needed
Monitor Vegetation	Monitor vegetation health and structure using remote sensing technologies	Every 3 years
	Integrate analysis of HMP and EMP monitoring data	Annually
	Analyze data to study management efficacy	Annually
	Interpret data to determine preferred habitat conditions	Every 3-5 years or as needed
	Conduct long-term PPM vegetation monitoring at permanent monitoring points	8-10 monitoring points annually
	Analyze changes in the structure and composition of habitat	Annually
	Conduct additional PPM vegetation monitoring in the enhanced vegetation management grids in advance of the current year and post treatment for two years	3 points per manipulated grid for 3 years
	Evaluate monitoring methods and apply an adaptive management approach	Annually
Monitor PPM	Integrate analysis of HMP and EMP monitoring data	Annually
	Analyze data to study management efficacy	Annually
	Apply an adaptive management approach	Annually
	Monitor PPM presence and activity in managed areas with wildlife cameras	Annually
	Monitor PPM presence with additional two track tubes per grid cell prior and post treatment	3 points per manipulated grid for 3 years

Goal	Objectives	Frequency
Monitor for Additional Threats	Participate in relevant events	Up to 12 h annually
	Collaborate with the City to expand suitable habitat across the preserved landscape	Annually or as needed
Reporting	Provide a work plan by 1 October	Annually
	Produce an annual report by 1 February	Annually
	Provide an annual fiscal report 1 February	Annually
	Revise the EMP	Every 10 years, or as needed

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EXHIBIT 3

Update to the Habitat Management and Monitoring Plan for Dana Point Headlands Biological Open Space

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Update to the Habitat Management and Monitoring Plan for Dana Point Headlands Biological Open Space

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1. Preface

The approximately 29-acre Dana Point Preserve (Preserve) was created in 2005 when it was conveyed to the Center for Natural Lands Management (CNLM), which has owned and managed it ever since in order to (1) protect the Preserve's rare coastal sage scrub community and habitat for the threatened coastal California gnatcatcher (*Polioptila californica californica)* and endangered Pacific pocket mouse (*Perognathus longimembris pacificus*) and (2) provide controlled public access on the trail through the Preserve offering views of the Pacific Ocean coastline.

The City of Dana Point (City) planned for the Preserve by adopting on September 22, 2004, the Headlands Development and Conservation Plan (HDCP) as part of its Local Coastal Plan (Headlands Reserve LLC and City of Dana Point 2004). The HDCP provides for establishment of the Preserve, designates it for Conservation Open Space, "the most restrictive land use within the [Headlands] project," requires long-term preservation and management of habitat for sensitive species, including the Pacific pocket mouse, provides for a non-profit trust to manage the Preserve in conjunction with the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW), and calls for recording a conservation easement to ensure the Preserve remains conserved open space. Noting that the Preserve "includes a limited bluff top trail . . . and limited visitor access to the coastline and natural environment," the HDCP provides that "[b]alancing the desire for limited public access and views along the perimeter, the [Preserve] is designed to protect a number of sensitive flora and fauna, including the Pacific pocket mouse" and "[a]s a result, and to protect this natural resource from overuse, only limited portions of the area will accommodate passive uses" and the "non-profit entity will establish hours of operation for the bluff top trail" (Headlands Reserve LLC and City of Dana Point 2004). Owing to its experience and expertise managing habitat for endangered species, CNLM was selected to be that non-profit entity.

The City authorized development of the Headlands Project, including the Preserve, under the California Coastal Act by issuing Coastal Development Permit 04-23 (Permit or CDP) on January 19, 2005 (City of Dana Point 2005). The CDP specifies that a "pedestrian trail of decomposed granite/gravel shall provide controlled access to the coastal bluff top" and requires all development to "be consistent with and comply with all requirements of the HDCP." It also calls for preparation of a habitat management plan to before disturbance of any environmentally sensitive habitat area (ESHA) and protection of preserve ESHA by dedication of a conservation easement to the City or other appropriate entity.

In keeping with the CDP, the Habitat Management and Monitoring Plan (HMMP) was prepared on April 18, 2005 (URS and CNLM 2005). The HMMP confirms that its implementation "will comply with and conform to the relevant requirements" of the HDCP and other approvals. The HMMP addresses various aspects of the coastal scrub ecosystem, endangered and threatened species, other sensitive species, and public use and education at length, and addresses public access on the Preserve trail only briefly. Confirming that "[c]ontrol of public access must be consistent with the [CDP]," it states that "[c]ontrol of public access to the [Preserve] will be the responsibility of CNLM in consultation with the City of Dana Point" and "[h]ours of operation to the [Preserve] and other Biological Open Space [i.e., areas owned by the City] will be 7:00 am to sunset," which it clarifies means "the anticipated hours of operation." (URS and CNLM 2005).

On December 20, 2005, CNLM, the owner of the Preserve, recorded a Conservation Easement (CE) over the Preserve to the City, which the City accepted as compliance with the CDP condition calling for a conservation easement (CNLM and City 2005). The purpose of the CE is "to ensure that biological values and resources in the [Preserve] continue to exist in perpetuity, and to prevent any use of the [Preserve] that will materially impair or interfere with such values and resources." The CE generally prohibits use of the Preserve except as otherwise provided in the HDCP, CDP, and HMMP and specially prohibits "[u]ncontrolled public access." It expressly permits certain portions of the Preserve to be open to the public and specifies that “such public access shall be controlled and shall be limited to the nature trail and overlook areas to be constructed on the [Preserve].” The CE expressly calls for the HMMP to be “updated at least every five years by [CNLM] consistent with best adaptive management practices and in consultation and coordination with United States Fish and Wildlife Service (“USFWS”) and the California Department of Fish and Game (“CDFG”).”

Pursuant to that direction and authorization, CNLM has prepared this Update to the HMMP with respect to public access to the Preserve. CNLM consulted and coordinated with USFWS and CDFW with provision of an earlier (January 28, 2022) version of this document. That draft document was also provided to the City and to the US Geological Survey (USGS)—a research-focused agency within the Department of the Interior. Formal comments were received from USFWS and CDFW through a joint letter (USFWS and CDFW 2022); informal comments were received from USGS. No comments were received from the City. The current document reflects not only consideration of comments received from the wildlife agencies and USGS, but additional literature discovered or reviewed since January 28, 2022, updates in visitor data, and information provided through informal means by several scientists.

CNLM has previously prepared annual work plans for the Preserve that provided specific and direct guidance for annual management activities. While generally consistent with the HMMP, the annual work plans did not formally update the HMMP itself. The work plans were provided annually to USFWS and CDFW for consultation purposes. CNLM is currently undertaking to prepare an update of the entire HMMP for the Preserve, which will address all aspects of management and biological monitoring. While preparation of that overall update is in progress, CNLM decided to complete this Update for the public access aspects of the HMMP because of: (1) the substantial amount of scientific information and direct management experience that have become available since 2005 that influence the conception of “controlled” public access relative to protection of onsite natural resources, including the information gained from recent COVID-related closures; and (2) the significant increase in the amount of public visitation since the trail was opened to the public in 2009. This Update to the HMMP was undertaken in consultation and coordination with USFWS and CDFW, as provided by the CE. This Update supersedes and replaces those portions of the HMMP addressing public access to the Preserve. To the extent there is any conflict between the HMMP and this Update, the terms of this Update control.

The HMMP also generally describes management for approximately 22 acres of property owned by the City, including Harbor Point Park, Hilltop Park, and South Strand Biological Open Space. This Update pertains only to CNLM's preserve and does not address or change management of the City's property.

2. Executive Summary

The approximately 29-acre Dana Point Preserve (Preserve), located within the City of Dana Point in Orange County, California, has been owned and managed by the Center for Natural Lands Management (CNLM) since December 2005. The Preserve, in addition to supporting a rare coastal sage scrub community with considerable biodiversity, provides habitat for (and extant occurrences of) two listed species—the (federal) threatened coastal California gnatcatcher (*Polioptila californica californica)* and the (federal) endangered Pacific pocket mouse (*Perognathus longimembris pacificus*). The first management plan for the Preserve (Plan) was drafted in 2005 but provided little information regarding public access, although noting that excessive or uncontrolled access could result in habitat degradation. A conservation easement, granted to the City by CNLM in 2005, is intended to ensure that biological values and resources in the Preserve continue to exist in perpetuity, and to prevent any use that would materially impair or interfere with such values and resources. For much of the period between 2009—when the trail on the Preserve was first opened to the public—until the COVID-related substantial closure in 2020, the trail was open to the public often seven days per week, typically 7:00 a.m. to sunset. CNLM staff closed the trail or modified public access as needed for trail maintenance, in particular, and for other reasons including protection of sensitive nesting locations. However, there was no underlying research or principles that supported this amount of public access in relation to the need to protect the sensitive onsite natural resources. Since then, a substantial and growing base of scientific literature shows that impacts from the visiting public in natural areas—even if staying on trails and only walking—can be significant. Those impacts can arise from the sight, sounds, vibrations, movements, and smells of the public. Further impacts can arise when the visiting public engages in behaviors that are prohibited on the Preserve, including walking off trail (and thus potentially crushing pocket mouse burrows, etc.), making biological collections, digging or erecting items on the Preserve, flying drones, smoking, depositing trash, and bringing other animals onsite. In spite of clear statements on signs of prohibited activities and CNLM staff efforts to control the public, all of those behaviors have been observed on the Preserve. Further, those impacts are additive with other impacts that are less controllable, including those from emergency personnel servicing some public safety issue and other threats such as climate change, pathogens that threaten species, and a widespread Argentine ant irruption correlated with adjacent developments.

The substantial number of studies that describe impacts from public presence in parks, preserves, and open spaces was augmented by data related to the Preserve's recent COVID-related closures. That unanticipated experimental opportunity, although arising from dire circumstances, provided new and undeniable evidence of the negative impacts on many aspects of natural systems and species from public recreational use since 2009.

The number of visitors using the Preserve trail since its inception in 2009 has risen dramatically. (References in this document to "number of visitors" that were recorded on the Preserve is more accurately defined as "number of counts by the infrared trail counters." See section 4.2 below.) CNLM started measuring public visitation in 2011. By 2017, the average number of visitors per day had doubled from 345 per day to 673 per day. Due to issues with the automated counters, data from 2018 and 2019 were collected only intermittently and were not reliable. When visitation data collection confidently resumed in 2020, the upward trend had continued (averaging 713 visitors per day) until the Preserve trail closure due to public health directives related to controlling COVID-19.

The Preserve trail was closed for several months in 2020 and was re-opened gradually later that year and into 2021. The Preserve trail has been open to the public on a stable schedule of three days per week, eight hours per day since mid-June 2021. During that time, the average number of visitors (504 per day) has been somewhat higher than the average across 2011-2017 (444/day) but much reduced from that in 2016 (613 per day), 2017 (673 per day), and the early 2020 observations of 713 per day. To summarize, based on experience in 2020-2022, reduction in number of days per week and hours per day that the trail is open to the public, resulted in a decrease in daily (and weekly and annual) number of visitors onsite.

Although direct impacts on the Preserve's natural resources are difficult to ascertain and fluctuations in the wildlife populations onsite no doubt reflect multiple influences, there is evidence of decreased Pacific pocket mouse presence after the trail initially opened in 2009, and an increase in the onsite population after the trail was closed to the public in 2020.

Review of scientific literature included many specific studies as well as several review papers that were meta-analyses of a large body of scientific literature on potential impacts of public visitation and recreation on natural resources. Although results are necessarily conditioned by context, the vast majority of the studies indicated impacts on natural resources from public use (even "passive recreation"), and the majority of those were negative impacts. Impacts can occur at the level of individual animals (e.g., stress, avoidance of an area because of public presence, interruption of feeding or mating activities) and scale up to the population level (e.g., reduction in reproduction and population size). The potential for habituation (i.e., getting "used to" public use of the area) was reviewed in the literature. This effect is not well studied but results from studies of other species suggest that the stimulus (in this case, public presence) would still most likely cause an impact, even if habituation reduced the degree of it.

Furthermore, for habituation to occur, the stimulus should be similar and predictable—but public presence on the trail is ever-changing in its composition of types and durations of sights, sounds, smells, movements, and vibrations, thus lessening the likelihood of habituation. As such, there is little evidence that the species on the Preserve simply “get used to it” and, if they do, it would still be at a cost and may even be maladaptive.

This review of data, literature, management experience, and principles of conservation biology has resulted in strong evidence of the need to adjust the amount of public visitation in an effort to protect the very sensitive species and ecosystem on the Preserve. Further, it confirms that the earlier employed hours of operation (days per week, hours per day) did not anticipate increases in public visitation over time and was not informed by the large body of scientific knowledge now available on the topic of impacts of “passive” recreation on natural resources. If the only goal pertaining to the Preserve were to protect the Pacific pocket mouse, the most protective strategy would be to prohibit public access. The Preserve is an exceedingly small area of habitat, only 29 acres, and is surrounded by development that destroyed much of the original similar habitat. While CNLM staff and partners have been working to manage other threats to species’ survival (especially Pacific pocket mouse) on the Preserve, including unsuitable vegetation composition and Argentine ants, public access has been a growing threat. Although the guiding concept for controlling public access must first and foremost be protecting habitat and species consistent with the purpose of the Preserve, additional concepts include maintaining reasonable public access to allow enjoyment of the Preserve, reducing the amount of visitation to adjust for increasing rates over time, continuing to provide access for emergency and research use, enhancing CNLM’s outreach towards providing the public with information about the sensitive natural resources as well as impacts from visitors, and continuing to monitor public visitation, natural resources, and relevant scientific literature so as to make future adjustments as needed.

Based on the rigorous review of scientific literature, the results of data analysis and experience based on Preserve conditions, and input from wildlife agency personnel and other scientists, changes to the public access schedule include reducing the hours of operation of the trail to reduce the overall amount of visitors on the trail, better avoidance of low-light periods of public access (shifting to later morning access and earlier afternoon closures), and providing no public access on some days of the week. In their review of an earlier draft that included these changes, the wildlife agencies concurred, indicating that: “Based on the status of PPM within the Preserve and the available information regarding the potential effects of outdoor recreation on wildlife, we support the proposed changes to the public access schedule” (USFWS and CDFW 2022). This Update also includes planned continuation of monitoring of public use and natural resource conditions, and outreach to the public to provide information on the sensitivity of the onsite natural resources so as to assist in a broader appreciation of the interactions between public presence and wildlife impacts.

The processes of information gathering, analysis, and adjustments will continue—this being consistent with the “best adaptive management practices and in consultation with the wildlife agencies” that is described in the conservation easement (CNLM and City 2005). As part of adaptive management, trail hours will be provided to the public through an “Hours Notice”. This information will be published on the CNLM website and posted at the Preserve.

3. Introduction

The Preserve is small (relative to its intended conservation purpose), has distinct and hard edges on most boundaries (being bounded by the Pacific Ocean on its western boundary and by hardscaped City streets and residential development on most of the rest of its perimeter; Figure 1), and is occupied by two listed species within a fragile and rare suite of landscape features. Those sensitive conservation values and challenges to sustainability might often indicate the need to limit any discretionary activities that could negatively impact the natural resources onsite. Nevertheless, access to the Preserve is provided to the general public for certain recreational activities. The Preserve is located within the California Coastal Zone and documents related to the Preserve's acquisition by CNLM indicate that the property be set aside as conservation open space, a trail be created, that limited and controlled public access be provided, and that CNLM determine and establish hours of operation of the trail. Accordingly, a trail was designed and created on the Preserve, and initially opened for public access in December 2009.

The Preserve is protected with a wildlife-friendly, six-foot-high iron fence (Figure 2) or concrete wall on all sides except the coastal bluff-tops and the border with Hilltop Park. CNLM's public access trail can be accessed by the visiting public from two locations with clearly marked gates—Scenic and Dana Strand (Figures 2 and 3). The trail is approximately ½ mile in length and includes five overlook areas (with benches and/or educational signs). Both the trail and overlook areas are well defined, enclosed by a post-and-cable trail fence. Any off-trail use would require intentionally climbing through or over the fence. Further, the trail meanders through the Preserve exposing the majority of it to potential public use impacts (i.e., within 100 meters of the trail). Gates are closed at all times except when individuals are entering and exiting the Preserve and are controlled by automatic devices powered by solar panels. The gates are locked during those hours of operation when the trail is not open for public access. Signs and interpretive panels provide information about the Preserve, including allowable (e.g., hiking, running, and wildlife viewing) and prohibited (e.g., collecting materials, smoking, off-trail use, drone use, pets, bicycles, etc.) activities for trail use (Figures 2 and 3). The prohibited activities listed on the signs are those most commonly encountered (or queried by the public) but are not an exhaustive list. As new types of potentially impactful recreation arise or studies indicate impacts from previously allowed activities, this public information is revised. Informational kiosks are also located at each gate with maps showing the trail and the list of trail use rules. The public also has access to informational brochures in the Nature Interpretive Center, created by CNLM and the City, that provide in addition to allowed and prohibited activities, a map of the trail, information on the common plant and bird species seen from the trail, and a list of alternative nearby areas where dogs are allowed on trails.

Figure 1. Overview of the CNLM Dana Point Preserve with boundary, trail, and gate features. The trail is the muted line within the Preserve area (bounded by a white line) and shows the overlook areas.

As described in the Conservation Easement (CE), “public access shall be controlled and shall be limited to the nature trail and overlook areas” (CNLM and City, 2005). In the CE, permitted public use was described as “passive recreation” with uses that could include, but were not limited to, walking, hiking, jogging, and bird watching. Notably, the CE continues to provide context for public use with the statement: “Notwithstanding the foregoing, this Conservation Easement does not convey to the public a general right of access to the Conservation Park but allows access for passive recreation along the Nature Trail and Overlook Areas.”

Since the trail was opened to the public in December 2009, it was often open daily from approximately 7:00 a.m. to sunset. In addition to control of those hours, the trail was further controlled by CNLM whose staff closed the trail in part or in its entirety from time to time for reasons that have included the nesting locations of gnatcatchers near the trail (where trail use would risk nest abandonment and the death of nestlings), repair of the trail where storm events have made it unserviceable and/or unsafe, repair and maintenance of fences and other infrastructure, or other preserve management activities that would have been significantly affected by public presence or that may present a public safety risk.

As any human use of the Preserve is potentially impactful, all types of and reasons for human access should be considered in providing context for “public access”. The types of human access on the Preserve since 2005 include:

- Emergency response (including rescue, fire response, incident investigation, and potentially training of first responders)
- Management and monitoring (by CNLM staff and others designated by CNLM for these purposes)
- Access by the general public for “passive” recreation and aesthetic enjoyment
- Research
- Public education

The HDCP, HMMP, and CE call for CNLM to employ principles of adaptive management in its preservation and management of the Preserve (Headlands Reserve LLC and City of Dana Point 2004, URS and CNLM 2005, CNLM and City 2005, respectively). Adaptive management generally is a process aiming to improve management practices incrementally by designing, adjusting, and implementing plans in ways that facilitate learning from experience. The U.S. Department of the Interior has elaborated:

> Adaptive management [is a decision process that] promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders (Williams et al. 2009, National Research Council 2004).

CNLM stewardship practices reflect the principles and include the core elements of adaptive management (Rogers 2007).

In keeping with the direction and authorization of the HDCP, HMMP, and CE, this Update is both a result and a manifestation of CNLM's adaptive management of the Preserve. By this Update, CNLM endeavors to make use of what it has learned since creation of the Preserve in 2005 and opening of the trail in 2009.

Figure 2. Interior sign on the Dana Point Preserve’s Scenic Gate referring to prohibited uses. Fence type that surrounds the majority of the Preserve can also be seen.

Figure 3. Exterior sign on the Dana Point Preserve's Strand Gate referring to prohibited uses. Some information is also provided on this sign on one of the two listed species on the Preserve—the coastal California gnatcatcher.

4. Information contributions to update on public access

Since the Preserve was acquired and the HMMP written, there has been considerable accumulation of information and experience that is relevant to the update of the public access plan, including:

- CNLM management experience on the Preserve relative to public access
- Increasing use of the Preserve by the public
- The increased vulnerability of PPM due to the loss of one of the remaining populations
- Results from monitoring the two listed species onsite
- Increasing threats to the natural resources onsite
- A growing base of scientific literature that provides evidence (and scientific principles) concerning the negative impacts of public access for “passive recreation”

Each of these topics has been explored and is described below.

4.1. CNLM management experience on the Preserve relative to public access

With over sixteen years of experience in managing the natural resources onsite and over twelve years of experience in managing public access of the Preserve, considerable insight has been gained into the relationship between these activities. Providing public access involves managing the public (i.e., onsite presence of CNLM staff to the extent possible) during public access hours, patrolling for illegal access (i.e., trespass into the Preserve when closed to the public and stepping off trail when the trail is open), and the communications and public messaging to support appropriate trail use. Public access has required considerable management to discourage and help prevent inappropriate and impactful behavior including going off the trail into the Preserve’s interior or towards the bluff, bringing dogs onsite, littering, smoking, etc.

Even for public visitation that is within “preserve rules”—that is, does not involve trespass off trails or outside the hours of operation—there can be substantial impacts from the sights, sounds, smells, movements, and vibrations of public presence. The public also can vector weed seeds that introduce or exacerbate weed problems on the Preserve and could threaten food and other habitat resources for the resident wildlife.

And, as further described in Section 4.6, serious viruses or other pathogens that could be stressful, harmful, or even catastrophic for resident species can often be vectored on footwear and clothing of the visiting public. Efforts to control that effect with trail entrance disinfecting stations are difficult to enforce and probably have little effect. The public typically disregard informational signage at the trail entrances and either don't recognize the need to take precautionary steps before using the trail or refuse to do so (K. Merrill pers. comm.).

The trespassing public—those that violate any of the trail rules—can have serious impacts. Walking off trail can result in crushing Pacific pocket mouse burrows, damaging vegetation, or affecting nests or reproductive activity (seasonally dependent) of the gnatcatcher and other species. Entering the Preserve when the Preserve is closed to the public could result in the same effects but with even more risk due to the above-ground activity of the Pacific pocket mouse (and many other species) during low-light and night-time conditions.

Other examples of impactful behavior by the public not abiding by trail rules include leaving food or trash onsite (may attract predators), bringing pets (usually dogs) onto the Preserve (sights and smells from domestic animals can have serious impacts on resident wildlife), making collections of plant materials for personal or commercial landscaping purposes (thereby potentially reducing the viability, amount, or reproductive potential of those plant species), and engaging in other activities that can threaten the Preserve or its component biota including geocaching, smoking, scavenger hunting, playing recorded bird calls/songs, conducting wedding ceremonies, establishing memorials, and using drones. All these behaviors have been observed by CNLM staff from time-to-time on the Preserve (see CNLM 2021). Such activities are stopped as soon as possible by staff upon detection, but it is not feasible to detect all such incidents and some harm may already be done by the time the activity is detected. In general, the more public visiting the Preserve, the more likely and the more frequent these events.

Another risk to the Preserve occurs if the Preserve is opened without CNLM intent. One example is unanticipated access by first responders towards addressing a public safety (e.g., health or crime) event. Those events have been rare and the value of public safety weighs heavily in the decision. However, other such unanticipated openings of the Preserve gates have occurred that do not carry such value—an example being the City's opening the Preserve gates on two occasions in 2020, creating uncontrolled public access until CNLM staff discovered the situation and provided appropriate control.

4.2. Increasing use of the Preserve by the public

In 2011, and in part because of concern over cumulative and increasing impacts from public access, CNLM installed infrared trail counters at both gated entrances (Dana Strand and Scenic) to the Preserve's trail. The intent was to gather objective data on the amount of public visitation of the Preserve trail over time. Data were inspected for any issues that may have resulted from power failures or failures in triggering counts upon entry of the public. Data were then cleaned to remove any suspect entries, resulting in some data missing for certain months. All days with reliable data counts were included in the dataset for the year and average number of visitors per day (i.e., per day of data collection) was calculated. Data collection during 2018-2019 was affected by a high incidence of dead batteries, corrosion of the electronic plates, frayed wires, and installation errors. Thus, data were very incomplete and were considered unreliable as estimates of public use of the trail. Accordingly, a seven-year presentation of visitation is provided for the period 2011 through 2017 (Table1, Figure 4). For this representation, data from one gate only (Scenic gate) were used. Although this could lead to an over-representation of visitors (i.e., those who both entered and exited from the Scenic gate), that bias is reasonably assumed to be counter-balanced by the opposite—i.e., visitors exiting and entering from the other gate only. Further, the number of visitors recorded is probably an underestimate of the actual number because the counter counts people passing the sensor with a delay of 1.5 seconds rather than counting all individuals, and visitors not infrequently enter the gate in a group—and thus would be counted as only one visitor. To be clear, references in this document to “number of visitors” that were recorded on the Preserve is more accurately defined as “number of counts by the infrared trail counters”.

It is clear there is a significant upward trend over time in average daily visitation, almost doubling in that seven-year (2011-2017) period from 345 per day to 673. If these averages are represented as estimates of annual number of visitors (multiplying by 365 as the trail was open most days of the year for that period), that would indicate an increase in visitors from over 125,000 in 2011 to over 245,000 in 2017.

Table 1. Average daily trail use counts and 95% confidence intervals (CI) at the Dana Point Preserve, 2011-2017.

Year	**Average Daily Visitation**[1]					**Annual Visitation Estimate**[2]
	Mean	**SE**	**N**	**Lower 95%CI**	**Upper 95%CI**	
2011	344.5	10.3	185	324.3	364.7	125,740
2012	319.6	9.8	248	300.4	338.7	116,637
2013	361.1	8.5	344	344.3	377.8	131,793
2014	355.8	9.2	306	337.8	373.8	129,851
2015	444.6	16.0	239	413.3	475.9	162,281
2016	612.7	19.3	366	575.0	650.5	223,643
2017	672.5	20.4	302	632.6	712.4	245,465

[1] Average daily trail use counts, which represents average daily visitation, were calculated as the total counts per year / days of data collection

[2] Estimates of annual visitation were calculated as average daily trail use counts * 365 days.

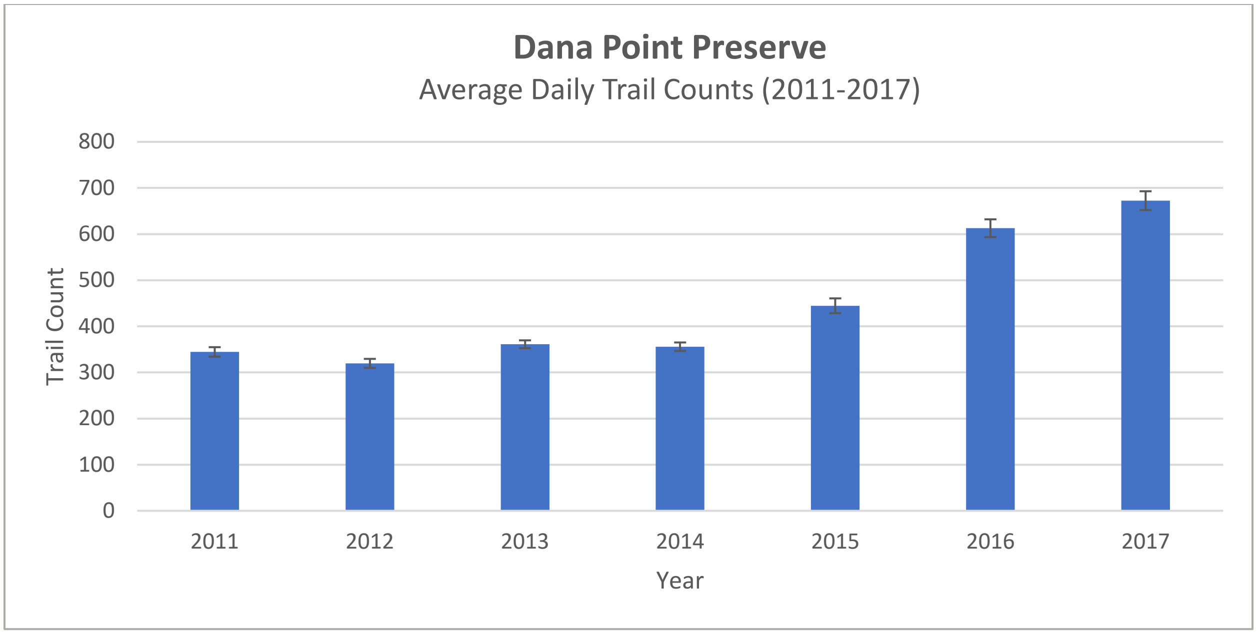

Figure 4. Average (Mean, Standard error) daily trail use counts (2011-2017) at the Dana Point Preserve.

The counters were reliably working towards the end of 2019. Data for January, February, and March 2020 (pre-COVID) showed an average of 713±62.0 (SE) visitors per day. This suggests that the upward trend represented in 2011-2017 had continued, with an ever-increasing daily average of visitors on the public trail and had potentially reached over ¼ million visitors per year. The trail was closed in mid-March 2020 to the public—initially for trail maintenance and then longer because of COVID-19.

The trail was re-opened gradually commencing in mid-October 2020—initially for two days per week, three hours per day. Public compliance with COVID-19 safety rules for the trial was monitored, as were COVID-19 statistics and public health directives, and, in response, the trail was temporarily closed mid-December 2020 to February 2021. By April 2021, the trail was opened for three days per week, and by mid-June 2021 it was open eight hours per day on those days. That schedule remained in effect through 2021 and to the present (April 2022). To determine whether visitation rates per day have been affected by the trail hours in 2021-2022, data collected between August 2021 and February 2022 were analyzed. The number of visitors per day, with the 2021-2022 trail hours schedule, was, on average, 503.8 (±29.7; 95% CI: 445.4-562.1). Extrapolating to annual visitation, based on three days per week, the estimate is 78,593. These data suggest that reducing the number of days per week that the trail is open to the public can effectively reduce the total number of visitors on a weekly and annual basis. Reducing the number of hours per day (to eight) also appears to have had a moderating effect in number of daily visitors. The average number of visitors was approximately 504 per day, somewhat higher than the average across 2011-2017 (444 per day), but much reduced from that in 2016 (613 per day), 2017 (673 per day), and the early 2020 observations of 713 per day. To summarize, based on experience in 2020-2022, reduction in number of days per week and hours per day that the trail is open to the public, resulted in a decrease in daily (and weekly and annual) number of visitors onsite.

The highest, and not just average, number of visitors per day could also be an important measure of impact on natural resources. Peak (one day) visitation can also be determined, although data are not available for every day that the Preserve's trail was open so the peak days for visitation (e.g., annually) can't be confidently stated. Further, as previously explained, because several people can enter a gate at one time and only be counted as one, and if there are many visitors in a short period of time this is more likely to happen, that suggests that on busy days, the counts are likely to be underestimates of actual visitors. The greatest number of counts recorded on a single day within the period 2011-2017 was 2,896 and occurred on December 26, 2016. The highest daily count for early 2020 (i.e., the Preserve was closed from mid-March until partially re-opened in October) was 2,175 (February 16, 2020). Peak visitation days may be related to certain holidays and weather, thus there is no direct comparison available between 2016 and 2020. The highest daily count for the period August 2021 through February 2022, when the three-day-per-week/8 hrs-per-day schedule was in place, was 1,537 (January 1, 2022). This suggests that reducing the number of hours per day may be effective in reducing the extremes in number of visitors per day, thereby potentially lowering impact on the Preserve's natural resources (if higher numbers of visitors per day is accompanied by greater impact than lower numbers).

4.3. Increased vulnerability of Pacific pocket mouse to extinction

The Pacific pocket mouse (PPM) has become rarer and hence more endangered since 2005. At the time the Plan was written, there were only four known populations. In fact, PPM were thought to be extinct beginning in the early 1970s until rediscovered in 1993 at what is now the Dana Point Preserve (Brylski 1993, USFWS 1994). Subsequent to its rediscovery, PPM was found in three additional locations on Marine Corps Base, Camp Pendleton (north San Mateo, south San Mateo and North Santa Margarita). However, PPM have not been documented in one of those three locations (North San Mateo) since 2003 (Natural Resource Assessment Inc. 2003, USFWS 2010). Therefore, it is suspected that this population has since been extirpated. As such, the species is now more vulnerable in having fewer well-established wild populations and the PPM population on Dana Point has become more important for the persistence of the species. Additionally, this site is the only non-federally owned property where the PPM occurs.

4.4. Results from monitoring the two listed species onsite

As a general assessment of onsite presence, the two listed species on the Preserve have been monitored to provide information on their presence and changes in presence over time. For the coastal California gnatcatcher, surveys have been conducted annually by CNLM staff following USFWS protocols and permitted by CNLM's 10(a)(1)(A) permits. In addition to indicating presence, the surveys were generally able to detect numbers of individuals and reproductive groupings (pairs). Baseline data for the Preserve's population of gnatcatchers, collected in 2006, suggest a modest presence of perhaps three pairs or family groups (Table 2). Between 2006 and 2018, that number fluctuated between three and seven pairs—such fluctuations not being surprising for this (sub)species and variations in habitat conditions. There was an increase in 2019 to 14 pairs detected, and an even stronger increase in 2020 of 20 pairs. The results for the 2021 monitoring events show a slight decline with 17 pairs detected, nine of which were successful at producing offspring (Table 2).

The visiting public potentially impact the gnatcatchers in various ways (see section 4.6), especially during breeding season. Although not all impacts are directly observable or would happen at such at time that would be noted by staff, there is at least one documented direct impact by the public. In 2018, one gnatcatcher nest was observed in a shrub immediately adjacent to the trail at Overlook 4. As a precaution to protect the nest, that small section of the trail was temporarily closed to public use (signs and temporary barriers were placed on both ends of the trail); however, visitors frequently ignored this closure and used that section of trail (CNLM 2019). Ultimately, that particular nest failed, and that pair did not produce a successful nest in 2018.

Table 2. Monitoring results for coastal California gnatcatcher on the Preserve 2006-2021.

Reporting Year	Survey Results
2006	3 family groups
2007	3 pairs; 1 nest produced 3 fledglings
2008	4 pairs; All pairs produced 3-4 fledglings each
2009	5 pairs; All pairs produced 3-4 fledglings each
2010	4 pairs; All pairs produced at least 1 fledgling each
2011	5 pairs; 4 pairs produced at least 1 fledgling each
2012	7 pairs; All pairs produced at least 1 fledgling each
2013	7 pairs; 6 pairs produced at least 2 fledgling ea.
2014	6 pair; 3 pairs produced at least 1 fledgling each
2015	5 pairs; 3 pairs produced at least 1 fledgling each
2016	6 pairs (min)
2017	5 pairs (min)
2018	7 pairs (min), one nest likely failed due to proximity to trail.
2019	14 pairs; at least 8 pairs successful. Multiple pairs attempted second nest.
2020	20 pairs; at least 9 pairs successful. Multiple pairs attempted second nest.
2021	17 pairs; at least 4 pairs successful. Multiple pairs attempted second nest.

For Pacific pocket mouse, detection is more challenging and less precise, given that they are nocturnal, dwell in underground burrows, and surface only for certain essential activities including foraging, mating, and dirt baths. Live-trapping has been conducted from time-to-time on the Preserve and this provides confirmation of the presence of the (sub)species and can provide some other indicators of population health (such as presence of both sexes, reproductive status, general health of individuals trapped).

Other reasons for trapping have been to provide individuals for the USFWS's captive breeding program and to allow for collection of samples for genetic testing. Fecal samples have sometimes been collected with the objective of analyzing for diet composition. The number of animals trapped has an uncertain and perhaps changing relationship to the actual number of mice on the Preserve, but it's reasonable to assume that it is a general indicator of high, medium, or low numbers overall on the Preserve.

Preserve staff have kept live-trapping at a minimum given its highly invasive nature. Stress to the trapped animals is inevitable and accidental deaths are possible. Live-trapping has been conducted in six years since 2008, commencing the year prior to the trail opening (2008) and again in May 2009—with the trail being opened to the public later in the year (Table 3). That year, there were 82 animals (unique individuals) trapped—up from 30 trapped the year prior. From that point on, the number of trapped individuals decreased dramatically over the three trapping events from 2012 to 2019, with only two animals trapped in 2019. Trapping was most recently conducted in summer 2020, coincidentally after the Preserve had been closed for over three months due to COVID-19. Although only two years had elapsed since the previous trapping events, the trapped number of individuals was dramatically higher: 77.

Although trapping success can also be associated with trapping "effort" (measured here as trap availability—e.g., one trap deployed for one night = one trap night), similar trapping efforts (e.g., 2009 vs 2012) resulted in very different numbers of mice caught, and high levels of trapping effort (e.g., >1200 trap nights) provided results that varied from 82 to 6 (Table 3). Although the trapping effort in 2019 was low relative to that in 2017, even tripling the outcome (i.e., as a rough estimate of effect of increasing the trapping effort to something similar to 2017) would have still resulted in a low number of mice trapped (hypothetically). The trapping effort in 2020 was lower than that in all the previous years but one since 2008, yet had the second highest number of mice trapped. Generally, vegetation management occurred over the entire period but there was a focus on vegetation management (i.e., removal of dead plant material) in 2020. In general, a high level of trapping will not result in significantly more captures if there is a low resident population; conversely, even a lower trapping effort can result in high trapping results if there is a robust resident population of mice.

Table 3. Results from all live-trap PPM monitoring events 2008-2020

Year of Trapping Events	Level of Effort (trap nights)	Trapping Results (unique PPM)
2008	3280	30
2009 (May)	3770	82
2009 (December) Trail opens to public		
2012	3330	57
2017	2286	6
2019	792	2
2020 (March 11) Trail closed to public		
2020	1254	77

Many variables and conditions can affect both the number of Pacific pocket mice onsite and the number of trapped individuals including, but not limited to, food supply, vegetative cover and composition, sex ratio, demographics, and influences on above- and below-ground behavior. The latter could include the influence of the visiting public. For example, data collected in 2020 indicated a significant correlation between vegetation management (in this case, removal of some dead vegetation, primarily shrubs) and location of PPM (Brehme et al. 2020). It is acknowledged that it is not feasible to have an experimental design that allows changes in PPM (or other species) to be attributed to any single factor—there are many moving parts in a natural landscape, as well as lag effects for some treatments or influences that may complicate the observed patterns.

Starting in 2011, CNLM used track tubes to monitor PPM using methods developed by experts in the field and following USFWS survey protocols. Prior to 2011, monitoring efforts only utilized live traps. The latter involves causing stress to the animals and potential harm from the trap itself or from subsequent handling. Since 2011, track-tube monitoring has been conducted, typically annually, supplementing occasionally with live-trapping when other kinds of data are needed.

Track-tube surveys have been used successfully for monitoring PPM (Brehme et al. 2014), providing information on presence/absence, areas occupied, and—depending on survey design—some phenological and demographic data. This information is valuable in guiding short-term management decisions, helping to reduce the risk of harassment or take of PPM, and determining any trends that may be important for the long-term management of the Preserve. Such surveys may also be an indirect indicator of habitat suitability for PPM.

While track-tube monitoring can provide important data on presence and area occupied within the Preserve, there is not necessarily any direct correlation with PPM abundance. As such, and because of the differences in track-tube monitoring effort and survey design over the years, live-trap data have been presented in this plan as a reference for changes in potential population size.

4.5. Increasing and new threats

COVID-19 was not the only significant viral attack in 2020. Also that year, rabbit hemorrhagic disease virus serotype 2 (RHDV2)—a fatal disease in rabbits—was documented in San Diego, Orange, and several other counties in California. This virus can be vectored on shoes and clothing of the visiting public. Infections on the Preserve or its vicinity would not only almost certainly result in the death of the rabbits but have further consequences for the ecosystem. But RHDV2 is just one example of viruses or other causes of extreme disease that will occur from time to time and public access can exacerbate the risks and consequences.

Snake fungal disease (*Ophidiomyces ophidiicola;* SFD) was also recently (2019) confirmed in California (CDFW 2019). SFD affects many snake species and presents a threat to the eight species of snakes found on the Preserve. Cases of SFD can be moderate to fatal. SFD lives in soil and can be transmitted to snakes by direct contact with infected animals or a contaminated environment; spread of the fungus to new locations may occur when people track contaminated soil embedded in clothing or shoes (Cornell University 2019).

Climate change is a continuing and expanding influence with uncertain impacts on the Preserve's natural resources. Across southern California, the average annual minimum and maximum temperature increased during the span of 1918-2006, +0.17 °C and +0.07 °C per decade respectively (EcoAdapt 2016). While increased annual temperatures will have impacts to the Preserve, it is likely that changes in annual seasonal variability will have a higher impact on the Preserve. Changes in maximum annual temperatures, rather than increased annual temperatures, have been shown to be correlated with local extinction events (Roman-Palacios and Wiens 2020). Since 2005, we certainly have experienced some drought effects. The longer-term influences of rapid climate change on weather patterns influencing the Preserve have some uncertainty. Nevertheless, any significant changes from historic patterns will undoubtedly have consequences for the plants and animals onsite. Changes in processes such as nitrogen deposition, decomposition, pollination, and soil water recharge could also have onsite consequences. These changing conditions can be stressors on plant and animal life, and consequences could include depressing effects on the food supply and habitat conditions for the Pacific pocket mouse and gnatcatcher, for example.

The Argentine ant (*Linepithema humile*, Mayr), a non-native invasive ant species, is considered a threat to many native terrestrial species in California and is listed as a global species of concern (ISSG 2021). In California, Argentine ants are more likely to be in high abundance along the coast than inland areas and in urban and agricultural areas more so than large natural open spaces (Mitrovich et al. 2010, Richmond et al. 2021). It is not surprising that, being coastal and urban, Argentine ants are present throughout the Preserve (CNLM 2019). While it is unknown when the Argentine was established in the Preserve, the infestation does appear to be at higher density than when the first CNLM Argentine ant survey was conducted in 2014. At that time, the Argentine ant naïve occupancy estimate was 65.6% (82/125 grids) while in 2018 the naïve occupancy estimate was 94.6 % (123/130) with more grids (87/130) having a "high number" of Argentine ants present on bait (i.e., >250 individuals) than in 2014 (32/125) (see CNLM 2014 and 2019).

The impact of Argentine ants on the arthropod community has been widely studied in agriculture and in urban and natural settings. Research has shown a negative relationship between Argentine ant presence and diversity of arthropods including native ant species and pollinators in their introduced range (e.g., Lach 2007, Naughton et al. 2020, Richmond et al. 2021)—both of which can impact pollination success (Rankin et al. 2018), seed set, seed dispersion, and germination success of plant species (Carney et al. 2003, Lach 2007). In addition, research has shown negative impacts of Argentine ant infestations on reptile and avian species (e.g., Suarez et al. 2005, Alvarez-Blanco et al. 2020). Within the Preserve, Argentine ants have been documented in failed gnatcatcher nests (K. Merrill pers. comm.). Direct impacts to mammals are less known. However, during PPM trapping events at Camp Pendleton Argentine ants were found in traps with and on PPM (and other small mammal species) (Brehme et al. 2014). Argentine ants are tramp species, likely drawn to the trap for the seed bait and can quickly monopolize resources including small vertebrates such as PPM, targeting their vulnerable areas (i.e., nose, mouth, ears and eyes). Argentine ants were also noted scavenging on two dead PPM, which were casualties associated with a live trapping event in 2020 (K. Merrill pers. comm.). While it is uncertain if the ants were the direct reason for the deaths, the negative impacts of Argentine ants on ecosystem health are known (e.g., Carney et al. 2003, Lach 2007, Rankin et al. 2018). As a result, the threat of Argentine ants has been highlighted in recovery plans for threatened or endangered species, including PPM (USFWS 1998). It is possible that Argentine ants directly impact PPM through predation in their burrows (Brehme et al. 2019) foraging on young and indirectly through harvesting seed caches. Trash left by visitors (i.e., food and beverages) exacerbates the threat by providing additional resources (sugary drinks in particular) to Argentine ants along the trail, in the adjacent parking lot, and within PPM habitat (K. Merrill pers. comm.)

Ongoing and increasing residential development in the vicinity of the Dana Point Preserve has the potential to increase indirect threats to sensitive species on the Preserve. Such threats may include an increase in the number of domestic cats and other non-native and native predators generally associated with human development (crows, ravens, raccoons, red fox), as well as negative impacts from vibrations, noise, and artificial lighting (USFWS 1998, 2010, Brehme et al. 2013-2020, D. Shier pers. comm.) and recreation (USFWS 1998).

4.6. Public impacts from trail use: scientific research

4.6.1 Introduction

A growing base of scientific literature provides evidence (and supports scientific principles) concerning the negative impacts of public access—even that type of public use that may have been described as “passive recreation” in 2005 when the Preserve was first protected. Negative effects related to recreational disturbance have been documented across a wide variety of species and taxa including, mammals, birds, reptiles, amphibians, and even invertebrates (e.g., Steven et al. 2011, Bennett et al. 2013, Larson et al. 2019). And more recently, the COVID-19 pandemic, with its associated closures of many public parks and preserves, provided an unprecedented experimental frame in which to evaluate wildlife and other natural resource responses to exclusion of the public for some time. (The authors acknowledge that the opportunity provided to scientists by COVID-19 closures of natural areas was and remains a tragic occurrence.) One collection of these pandemic-related research activities was prefaced by the statement that “an increasing body of evidence is emerging that indicates non-consumptive recreational activities like hiking, which [doesn’t] involve harvesting of resources, can have harmful effects on species, their habitat, and efforts to protect them” (Unger 2020).

The increasing awareness of potential effects of recreation on wildlife has not only led to a proliferation of research but further prompted reviews and syntheses of these studies (e.g., Larson et al. 2016, Larson et al. 2019, Miller et al. 2020, Dertien et al. 2021). Larson et al. (2016) reviewed 274 scientific articles that were global in geographic scope and included a broad range of taxonomic groups. The objective of that review was to identify knowledge gaps and assess evidence for effects of recreation. In that review, it was found that 93% of published studies documented at least one effect of recreation on animal species and most of those effects were negative (Figure 5). Given that the definition of “positive” interactions included increased biodiversity (which would also include non-native species) and habituation (which is often at a cost to the species, even if present, and may cause ecosystem-level issues), the percentage of negative impacts was probably under-represented.

In 2019, Larson et al. conducted a meta-analysis of recreation effects on vertebrate species richness and abundance. In this analysis, they parse recreation by terrestrial and aquatic and wildlife by carnivores, herbivores, and omnivores, as well as by taxa (Larson et al. 2019). Another review by Miller et al. (2020) investigated the effects of recreation in the context of public lands and recreation management. They categorized recreational activity into five types based on the use/non-use of motorized equipment, season, and location (terrestrial vs. aquatic) and within these categories, synthesized existing research for each of six taxonomic groupings of species. The authors’ objectives were to provide a reference for public land planners and managers, describe management principles, and outline priority research and administrative study areas towards better understanding recreation-wildlife interactions and minimizing negative effects on wildlife while maximizing the benefits gained by recreationists. Another review by Dertien et al. (2020), which included 38 years of effect of non-consumptive recreation on wildlife, identified and quantified “effect thresholds”, or the point at which recreation begins to exhibit behavioral or physiological change to wildlife. These authors provide quantitative guidelines for various wildlife groupings (wading birds, raptors, songbirds, ungulates, rodents, etc.) that can be used by planners and natural resource managers for the design of recreation infrastructure and management of recreation activities.

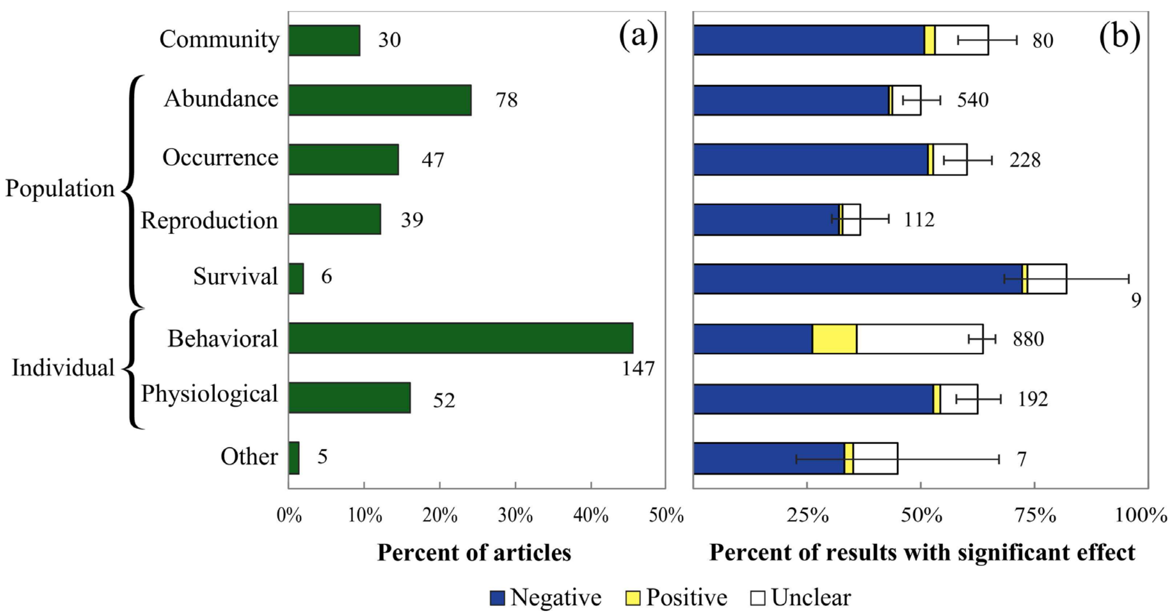

Figure 5. Types of animal responses to recreation from article review (excerpt from Larson et al. 2016). Response types are categorized into community-, population-, and individual-level responses. Panel a) shows the percent of articles in which each response type is tested (numbers of articles follow the bars). Panel b) shows the percent of results in which a statistically significant effect of recreation on an animal species was observed (number of results follow the bars). Total percentages are divided into negative, positive, and unclear effects of recreation. Error bars show standard error for the sum of all effects.

For the purpose of this update, the literature was queried for studies related to public trails and/or recreation and related impacts, if any, on natural resources. Dozens of studies were reviewed and are further described (taxa, location, objectives, results) in

Appendix A. This is not a comprehensive list but a sample of literature pertaining to public access, anthropogenic disturbance, and the effects on natural resources of public use. Most, but not all, studies reviewed reported negative effects from public use of trails. However, the majority of studies did report negative effects—see, for example, the meta-analysis by Larson et al. 2016. For studies that reported any positive effects, those were frequently because habituation and/or increases in biodiversity (even if non-native species were included) were considered positive, or because public visitation was tied to financial support for the conservation area and suffered if tourism was reduced.

In general, damaging effects on animals resulting from recreation activities include reduced reproductive success (Beale and Monaghan 2005), declines in abundance and occurrence (Reed and Merenlender 2008), modified habitat use (George and Crooks 2006), and altered species richness and community composition (Kangas et al. 2010). Disturbance from recreation may have both immediate and long-term effects on wildlife. The immediate response of many animals to disturbance includes physiological stress, change in behavior (interruption of foraging, fleeing), or altering reproductive behavior (Persons and Eason 2017, Gutzwiller et al.1994, Arlettaz et al. 2007). Over time, energetic losses from flight, decreased foraging time, or increased stress levels come at the cost of energy resources needed for individuals' survival, growth, and reproduction. The cumulative, compounding adverse effects of predator-avoidance behaviors can have impacts on fecundity and every component of offspring survival, with long-term implications for population growth (Allen et al. 2021).

Human disturbance on wildlife from non-consumptive recreation can result in altered spatiotemporal habitat use (Kangas et al. 2010), extirpate wildlife from otherwise suitable habitat, or cause animals to shift geographically into areas of lower quality habitat to avoid areas with human activity (Taylor and Knight 2003, Ficetola et al. 2007, Finney et al. 2005, Kangas et al. 2010, Mallord et al. 2007, Dertien et al. 2021). Thus, recreational disturbances can both reduce habitat suitability and ultimately result in functional habitat loss (Gutzwiller et al. 1994, Frid and Dill 2002, Tost et al. 2020).

Fragmented habitats may present unique stressors if there is no adjacent habitat for animals to relocate to, forcing individuals to remail in proximity to disturbance that they would otherwise avoid (Frid and Dill 2002).

There is much complexity in studying, and then understanding, the interaction between recreational activities and wildlife response. Conceptual frameworks can assist in structuring such complexity and informing experimental designs. One such framework identifies three important factors or “modulators” in these interactions: wildlife, human, and context (Figure 6, Tablado and Jenni 2017). The framework represents increasing levels of complexity in the mechanisms for wildlife response—from sensory detection; to short-term behavioral changes and physiological responses; to changes in survival, production, spatial use of the habitat, and chronic stress; and finally, changes in population trends and distribution. These levels of complexity also mirror the level at which the effect is occurring: from individual- to population-level, and the latter then also affecting species-level condition. In a review of global literature on wildlife-recreational interactions, many of the articles reviewed reported impacts at both the individual- and population-level, and of the former, the most often noted were behavioral impacts (Larson et al. 2016, Figure 6).

At the individual level, wildlife-recreational interactions can elicit responses that are generally categorized as behavioral or physiological. Behavioral interactions can be both short term and longer term and can be innate (perhaps genetic) or learned, or a combination. Examples of short-term and longer-term behavioral responses have been provided in a recent literature review and analysis of such interactions (Table 4, Miller et al. 2020). The responses are highly variable (from attraction to avoidance, and from habituation to sensitization)—thus emphasizing the complexity of these interactions and their dependence on the specific human, wildlife, and context “modulating factors”.

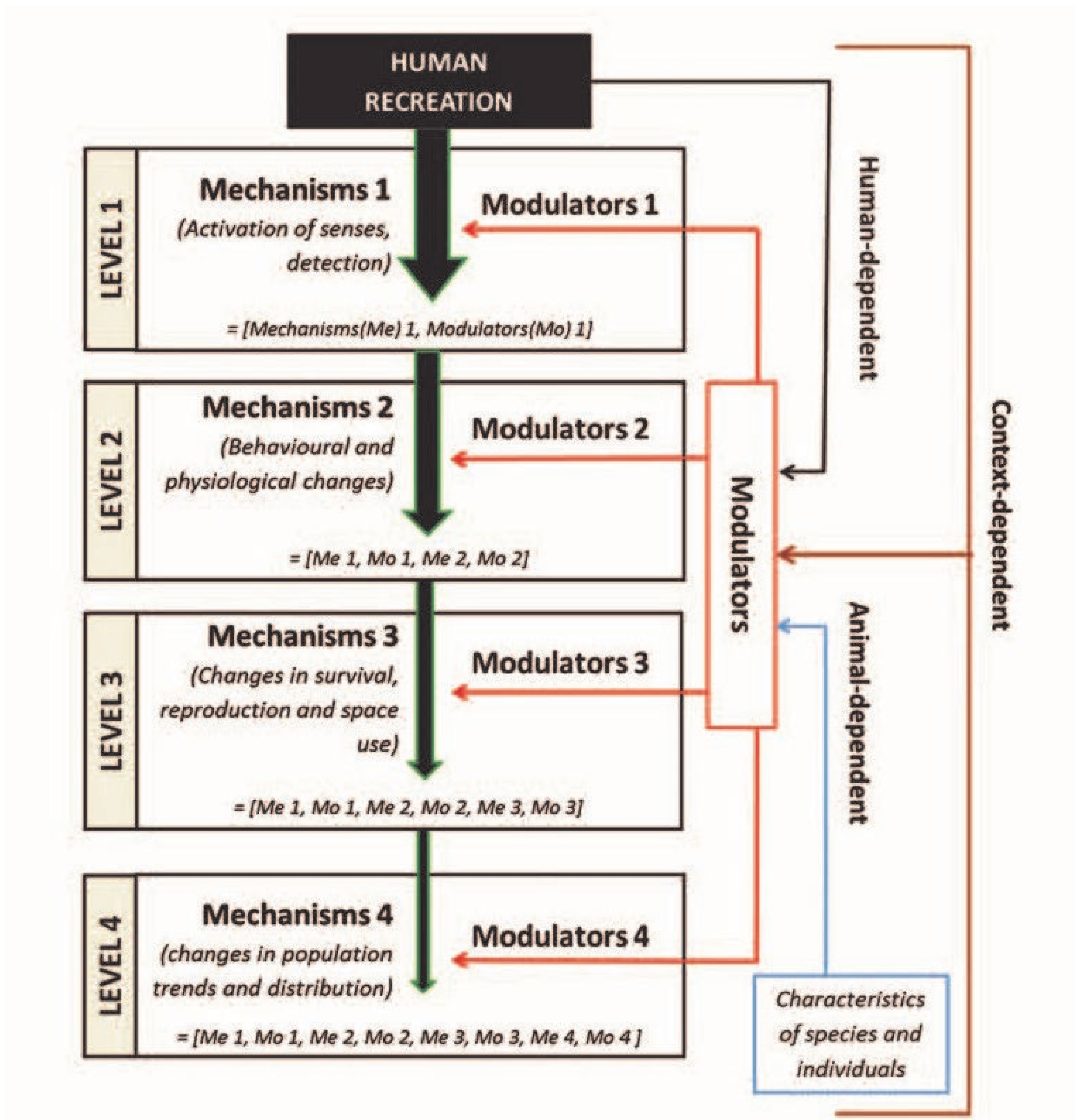

Figure 6. Conceptual framework showing different levels in the processes of human-wildlife interactions (excerpt from Tablado and Jenni 2017).

Table 4. Short-term and long-term learned behavioral responses of wildlife to human activity (excerpt from Miller et al. 2020).

Behavioral response	Definition	Example	Source
Short-term responses:			
Attraction	The strengthening of an animal's behavior because of rewards or positive reinforcement.	A chipmunk is attracted to areas where recreationists leave food.	Knight and Gutzwiller 1995
Avoidance	The strengthening of an animal's behavior because of persecution or negative reinforcement.	Grizzly bears in an area with high human activity levels often flee from people, while those in an area with no or little human activity do not.	Knight and Gutzwiller 1995
Tolerance	Intensity of disturbance that an individual tolerates without responding in a defined way.	Terns ignore heavy vehicle and boat traffic. This is measured in the short term, and evidence of this tolerance increasing over time is absent.	Nisbet 2000
Long-term responses:			
Habituation	Waning of a response to a repeated stimulus that is not associated with either a positive or negative reward.	Birds habituate to stimuli that are predictable and nonthreatening, such as road traffic, but are startled by sudden and unpredictable noises such as gun shots.	Eibl-Eibesfeldt 1970
Sensitization	Increased behavioral responsiveness over time when animals learn that a repeated or ongoing stimulus has significant consequences for the animal.	Avoidance of noise or other stimuli associated with danger; entails an increased energy expenditure to avoid danger.	Richardson et al. 1995

Another variable that may be useful in an experimental framework to study wildlife-recreational interactions is distance from the source of the potential disturbance. The source could be a trail, for example, and potential impacts measured for a variety of species at varying distances from the trail (assuming the trail is regularly used for recreation). Reasonably, the effects may be related to the spatial scale at which various species occupy and use the area, and perhaps also may be seasonally dependent (e.g., populations may be more or less sensitive during certain stages of a life-cycle). Although no specific information on this topic is available for Pacific pocket mouse, three "distance zones" were superimposed on the Preserve to provide a sense of how this concept might be experienced. Three zones—13, 50, and 100 meters from the trail—were mapped (Figure 7). Given the meandering nature of the trail, even the shortest (potential) impact zone (13 meters) covers a significant portion of the Preserve (16%). That distance was selected on the basis that this may be the average diameter for PPM core home range (Shier 2009). The other two distance zones, 50 and 100 meters, reflects some literature that found that smaller rodent species avoided areas within 50-100 meters of trails or people (Dertien et al. 2021). At 100 meters, almost 90% of the Preserve is included in the potential impact zone.

In the following sections, there is continued discussion of the relevant literature, beginning with a description of the ecology of the Pacific pocket mouse so as to better allow connections to be made with potential influences or threats to this subspecies. Following that, the literature has been categorized by general taxonomic groups: vertebrates, invertebrates, and habitat and vegetation communities. Given the likelihood that dogs would be perceived as a threat to PPM and that they are occasionally brought onto the Preserve by visitors, some literature is presented that examines wildlife responses to domestic dogs. Finally, the topic of habituation is explored, given that it is a potential modulator in the response of wildlife to public recreation on the Preserve.

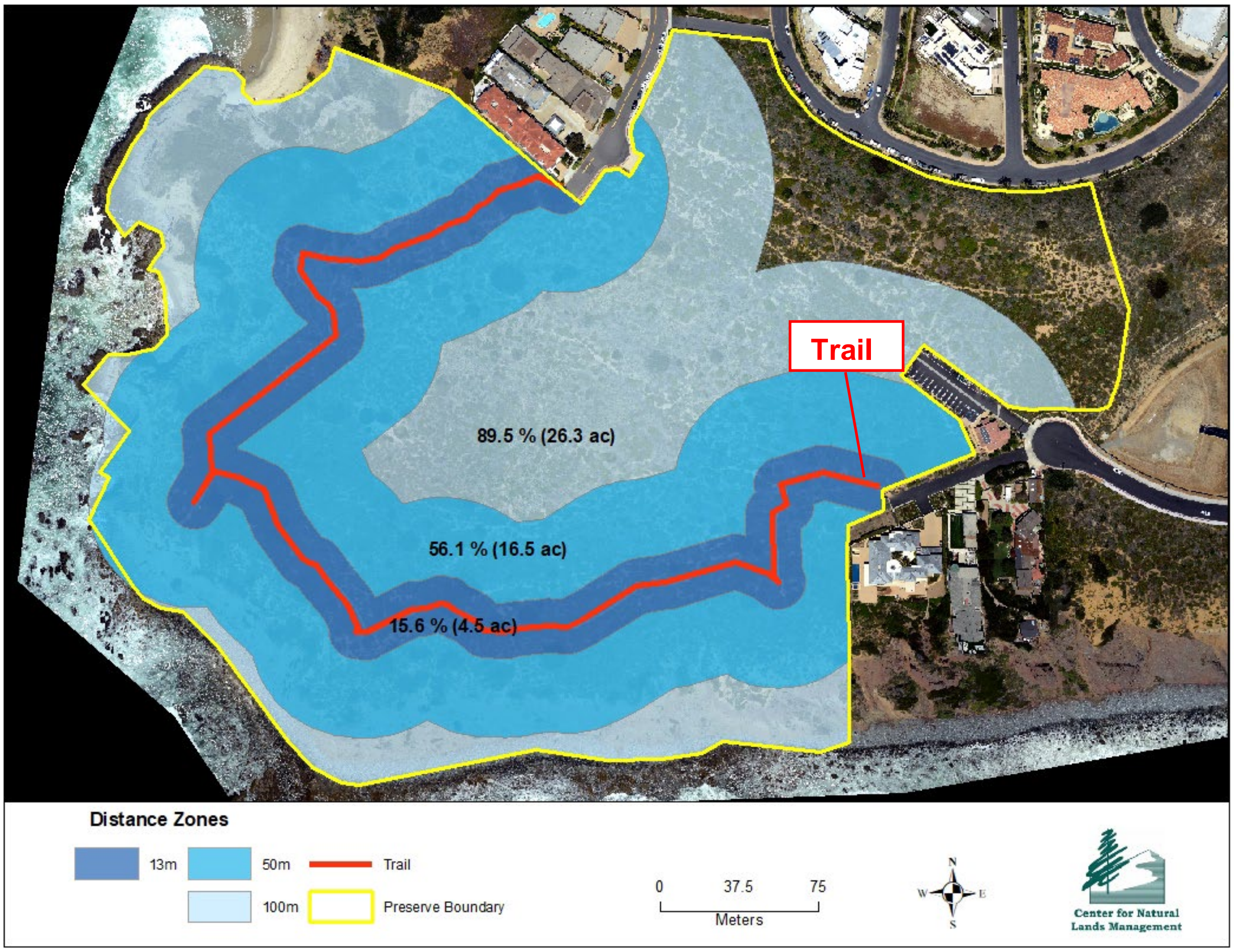

Figure 7. Zones of varying distance (13m, 50m, 100m) from the trail at the Dana Point Preserve. Values show proportion (%) and area (acres) of the Preserve covered by each zone.

4.6.2. PPM ecology and impacts from human disturbance

The Pacific pocket mouse is a nocturnal, aggressively solitary, and semi-fossorial rodent in the family Heteromyidae that is physiologically adapted to warm and dry climates (USFWS 1998). It is the smallest subspecies of the little pocket mouse (*Perognathus longimembris*), generally ranging between 7–9 grams in adult body mass (USFWS 1998). Adults weighing as little as 5 g and as much as 12 g have been trapped on the Dana Point Preserve (K Merrill pers. comm.). Average life expectancy in the wild is approximately 1 year, with survival for as long as 3–5 years not uncommon (French et al. 1967, 1974). This short life expectancy contributes to the population's vulnerability:

significant impacts to even one reproductive cycle could have serious consequences for the sustainability of the population.

The onset of breeding is typically in early spring and lasts through July (USFWS 1998). The time period during which a female PPM is in peak estrus can be extremely limited (i.e., as brief as one hour per cycle, D. Shier pers. comm.). Disturbance during this time could dissuade reproductive behavior. Females gestate young for approximately three weeks and wean after 30 days.

Reproduction is also influenced by food availability. In fact, reproduction may not occur in years of low food resources (Brehme et al. 2019) but in high resource years, adult females in the wild may have up to two litters with their female offspring mating and reproducing in a single season (Miller and Pavelka 2008). PPM is largely granivorous, specializing on grass and forb seeds (USFWS 1998). A positive relationship was found between forb cover and PPM occupancy at Marine Corps Base Camp Pendleton (MCBCP; Brehme et al 2014) and at the Preserve (Brehme et al 2020). Genetic analysis of PPM scat has shown that diet varies across populations and that within one season, regardless of available seed resources from shrubs and grasses, they tend to select a wide variety of forb species (Iwanowicz et al. 2016). Years with low forb growth and early forb die-offs have been associated with PPM declines (Brehme et al. 2019). Food availability is thus related to successful production of grass and forb seeds (for the most part) on site—which is, in part, weather-related. Considerable research has tied reproduction in heteromyids and other desert rodents to precipitation (Reichman and Van De Graaff 1975, Kenagy 1973, Kenagy and Bartholomew 1985, Beatley 1969). But food availability can also be influenced by competition from other species for the same food resources, loss of food sources from insects and disease, and destruction of plants from trampling or picking.

PPM create and live in burrows beneath the soil surface, and cache seeds below ground and within burrow systems for sustenance throughout the year (e.g., Randall 1993). More recent research has provided evidence that both pit caches and larders may be used (Chock et al 2019). In sand dunes in Oceanside, CA, burrows were found approximately one foot below the surface under vegetation edges and ended in a single nest chamber (Bailey 1939). Burrows and tunnels can sometimes be even closer to the surface—as little as 1 to 4 inches below ground (D. Shier pers. comm.). As such, sounds and vibrations from above-ground disturbances such as trail users, could affect PPM below ground. In sandy habitats, burrows are particularly vulnerable to compaction by foot traffic. Brehme et al (2014) reported a strong negative effect of human foot traffic on PPM occupancy. Although much remains to be studied regarding burrow architecture, recent observations have indicated that the height of the burrows may be very shallow (e.g., 1 inch)—further indicating their vulnerability to collapse.

Pacific pocket mice, while remaining below-ground for substantial amounts of time, of course need to conduct life-sustaining activities at the surface including feeding and food collection, selecting mates and mating, territory exploration and expansion, and bathing (i.e., dust baths). The average PPM core home range size is estimated to be 0.017 ha, or ~13m in diameter (Shier 2009) but individuals have been recorded traveling 181 m in a single night, with average movement distances reported of 10 m to 30 m between successive captures (Dodd et al. 1998, 1999, Miller and Pavelka 2008). Mark-and-release studies indicate limited adult movement and juvenile dispersal distances (Swei et al. 2003).

Those activities are typically conducted at night or during low-light levels. As such, artificial night-time lighting may cause problems for nocturnal rodents such as the Pacific pocket mouse, through potential modification of predation rates, obscuring of lunar cycles, and/or causing direct habitat avoidance (USFWS 1998, Shier et al. 2020). A study of the effect of different levels and orientation of (artificial) night lighting on PPM at Marine Corps Base Camp Pendleton indicated that anthropogenic light negatively affected foraging of PPM (Wang and Shier 2017). As such, it reasonably follows that disturbances during low-light levels of the day (towards sunset or for some time after sunrise, and as influenced by fog or cloud cover) can shorten or discourage such essential activities.

PPM use seasonal heterothermy (winter torpor and facultative summer aestivation) in response to environmental stresses of food shortage and/or low temperatures (Chew et al. 1965; Bartholomew and Cade 1957). The onset of torpor is marked by a large drop-off in activity that can occur from June to November and is highly spatially variable within and among years (Meserve 1976a; Shier 2009; Brehme et al. 2014, 2020). During torpor, the mice alternate between periods of dormancy and feeding on cached seeds. Periods of dormancy have neither a daily nor strictly seasonal pattern (Brehme et al. 2014). In captivity, dormant individuals may show some activity each day within their burrows. Emergence typically occurs in late winter to early spring (February-March) and is thought to coincide with seed availability (Meserve 1976b). It has been suggested that the trigger for emergence may be changes in soil temperature (French 1977).

As the beneficial aspect of torpor or aestivation is to reduce energy expenditure, any disturbance that disrupts these states can have a negative effect. Again, such disturbances could include human-caused sounds or vibrations—especially if burrows are shallow and/or close to the surface. Further, because Heteromyids have expanded middle ears, they are especially sensitive to low frequency sound (D. Shier pers. comm.).

4.6.3. Impacts on vertebrates

Across many vertebrate species, species richness and abundance are lower in association with higher levels of recreation, and the negatives effects of recreation appear to be most pronounced for birds and mammals (Larson et al. 2019). Research on impacts to reptiles and amphibians are less represented but the majority of existing studies have found effects are negative (Miller et al. 2020). Even quiet recreation such as walking and wildlife viewing can have significant negative impacts on vertebrate wildlife (Papouchis et al. 2001, Arlettaz et al. 2007, Reed and Merenlender 2008, Hennings 2017), such as increased time spent in flight and vigilance behaviors (Naylor

et al. 2009). Disturbance increases with intensity (a combination of people per day, noise level, and speed) of recreational activity, and is greater in response to less predictable activities (Shutt et al. 2014, Miller et al. 2020).

Indirect effects of increased human presence can occur when humans create an environment of higher predator pressure or cause animals to temporally shift their activities to avoid human activity. In an urban park, white-footed mice (*Peromyscus leucopus*)—primarily a crepuscular-nocturnal forager—spent less time foraging in areas of high human use even though people were not allowed in this park after dusk, possibly due to increased predator presence along trails (Persons and Eason 2017). Temporal shift to avoid human activity can cause some species to become more nocturnal; such "diel shifts" can bring predator-prey species into greater overlap, with increase predation risks (Patton et al. 2019), or lead to suboptimal foraging (Wheat and Wilmers 2016)

Artificial illumination (artificial light at night; ALAN) is an increasing form of human-caused disturbance that can affect vertebrate behavior and ecology. Small prey species may be particularly susceptible to ALAN as it makes them more conspicuous and thus more vulnerable to predation by visual predators. A study by Shier et al. (2020) examined impacts of ALAN on foraging decisions of the endangered Stephen's kangaroo rat (SKR, *Dipodomys stephensi*). ALAN decreased the probability of resource patch depletion compared to controls, indicating that ALAN reduced habitat suitability for this at-risk nocturnal rodent.

The presence of recreational trails in natural areas can limit the abundance or density of some bird communities (e.g., Bötsch et al. 2017), particularly of those species which nest or forage on the ground (Thompson 2015). For birds, impacts associated with trails may be due to interference with breeding behavior (Gutzwiller et al.1994), a reduction in foraging time (Frid and Dill 2002), alteration to vegetation structure near trails (Fernández-Juricic et al. 2001), the introduction of invasive species (Loss and Blair 2011), or increased presence of nest predators (Miller and Hobbs 2000). A review by

Steven et al. (2011) that included 69 research papers on the effects on birds of non-motorized recreation, found that 88% of these studies reported negative effects, including impacts to physiology, behavior, abundance, and reproduction.

Increased anthropogenic noise can interfere with avian acoustic communication (Slabbekoorn and Ripmeester 2008, Barber et al. 2010). Impaired communication resulting from anthropogenic noise has been linked to altered predator avoidance behaviors (Anze and Koper 2018), lower lek attendance in greater sage-grouse (*Centrocercus urophasianus*) (Blickley et al. 2012), reduced pairing success in ovenbirds (*Seiurus aurocapilla*) (Habib et al. 2007), and impaired nestling development in house sparrows (*Passer domesticus*) (Schroeder et al. 2012), indicating that the impacts of noise on communication have the potential to interfere with reproductive processes. Anthropogenic noise may function as a deceptive signal to wildlife, causing animals to engage in false responses that may be energetically and biologically costly. Evidence of this is provided by a study of endangered SKR, in which traffic noise not only masked but also mimicked foot-drumming signals (Shier et al. 2012). For vulnerable species such as SKR, the combined effects of communication disruption and signal deception may further tax already endangered populations.

4.6.4. Impacts on invertebrates

Predator-avoidance responses are not limited to vertebrates. Endangered Karner blue butterflies (*Lycaeides melissa samuelis*) were found to be sensitive to recreational disturbance and responded to recreationists as they would from natural threats, such as predators (Bennett et al. 2013). Through simulations these authors determined that regular disturbance could reduce egg laying potential and significantly restrict host plant choice, which in turn, could impact the butterfly's population dynamics. Invertebrates including butterflies, ground beetles, and spiders can also be affected by changes in vegetative structure (Blair and Launer 1997, reviewed in Miller et al. 2020). Butterfly species richness and diversity were lower in recreational areas as compared with biological reserves where recreation was prohibited (Blair and Launer 1997). Other

general anthropogenic impacts to insect populations can result from light pollution. ALAN strongly reduced moth caterpillar abundance compared with unlit sites, affected caterpillar development, and disrupted the feeding behavior of nocturnal caterpillars (Boyes et al. 2021).

4.6.5. Impacts on habitat and vegetation communities

Recreation can impact wildlife habitat by altering soil characteristics, water quality, and vegetative communities (Cole 1995, Barros and Pickering 2017, reviewed in Miller et al. 2020). Direct impacts to habitat and vegetation from trail use include through a loss of vegetative cover (Cole 1995, Barros and Pickering 2017), a decrease in vegetation biomass, or damage to tree and shrub seedlings (Sun and Liddle 1993). Recreational trails can function as corridors that facilitate the spread of non-native plant species into wildlands (Underwood et al. 2004, Wells et al. 2012, Liedtke et al. 2020). Trailheads, in particular, have been found to harbor high diversity and abundance of non-native plants within the seedbank and may function as a source point for invasions into protected areas (Wells et al. 2012). Additional indirect effects of recreation on vegetation community can occur when humans facilitate the spread of pathogens. The exotic pathogen, *Phytophthora ramorum*, for example, which is the cause of Sudden Oak Death, is likely spread by humans both within already infected areas and to novel locations (Cushman and Meentemeyer 2008).

4.6.6. Impacts of domestic dogs

The presence of pets and companion animals in open space and other protected areas may also cause direct and indirect impacts to wildlife species (Reilly et al. 2017). The effects of domestic dogs (*Canis lupus familiaris*) on wildlife have been reviewed extensively and disturbances to wildlife from domestic dogs and dog-walking are well documented (Banks and Bryant 2007, Steven et al. 2011, Hennings 2016, Reilly et al. 2017). Dogs are a domesticated subspecies of wolf and their presence and scent

(which remains after dogs are gone) repels many wildlife species and incites antipredator responses (Epple et al. 1993).

A review by Hennings (2016, 2017) on the effects of dogs concludes that (1) people with dogs on leash, and even moreso off-leash, are more alarming and detrimental to wildlife than any non-motorized recreational user group without dogs and that (2) people with dogs substantially increase the amount of wildlife habitat affected. The effects of dogs may be long-lasting and linger after the dog is gone, because the scent of dogs repels wildlife (Epple et al. 1993). It may be, too, that wildlife do not habituate to dogs (particularly off-leash dogs) because wildlife perceive dogs as predators, and because their behavior can be unpredictable (Banks and Bryant 2007, Weston and Stankowich 2014, Hennings 2016, Gomez-Serrano 2021).

People with dogs may represent the highest disturbance type of recreation for birds (Miller et al. 2020, Gomez-Serrano 2021). Dog walking in woodlands lead to a 35% reduction in bird diversity and 41% reduction in abundance, not just in areas where dog walking was common, but also where it was prohibited (Banks and Bryant 2007). Moreover, this study found no evidence of habituation even with leashed dogs and even where dog-walking was frequent; the disturbance was much weaker for people than dogs (Banks and Bryant 2007). Studies in California and Colorado showed that bobcats avoided areas where dogs were present, both in terms of spatial displacement (George and Crooks 2006, Lenth et al. 2008, Reed and Merenlender 2011) and temporal displacement in which bobcats switched to nighttime for most activities (George and Crooks 2006). In Colorado, mule deer showed reduced activity within 66 m of trails where dogs were prohibited (i.e., response to people only), but within 100 m of trails where dogs were allowed (Miller et al. 2001). Similar effects were also found for small mammals, including squirrels, rabbits, chipmunks, mice, prairie dogs (Bekoff and Ickes 1999, Lenth et al. 2008), and marmots (Griffin et al. 2007).

4.6.7. Habituation of Wildlife to Human Disturbance

First described in the field of neuroscience, habituation is a concept that should be considered relative to potential impacts of the visiting public on wildlife. Simply put, do wildlife ever just “get used to it”? In neurobiology, this effect is generally defined as a form of (non-associative) learning: the magnitude of the (typically physiological) response to a specific stimulus decreases with repeated exposure to that stimulus (Grissom and Bhatnaga 2009). Exposure to human activity can cause animals to avoid human-dominated areas or shift temporal activity patterns (Frid and Dill 2002, reviewed in Dertien et al. 2021), but repeated, benign exposure can also result, in some situations, in habituation of individuals, leading to some degree of human tolerance (Wheat and Wilmers 2016).

Studies suggest that habituation is more likely when a recreational activity is visually and acoustically predictable in location and time (Cassirer et al. 1992), and that propensity toward habituation varies by species and even individual temperament (Papouchis et al. 2001, Martin and Reale 2008). Sex and breeding status may also mediate the response or likelihood of habituation (Papouchis et al. 2001, Gómez-Serrano 2021). For example, in a coastal population of nesting plovers in Spain that displayed some degree of habituation to humans, females nesting plovers flushed more frequently than males, suggesting that they may perceive risk differently (Gómez-Serrano 2021).

While potentially beneficial to some species at certain places and times (e.g., Larson et al. 2016, Bateman and Fleming 2017), habituation can also be considered negative at the community level (e.g., George and Crooks 2006, Larson et al. 2016). Species that are more likely to habituate to recreation-related disturbances are often habitat generalists, and some studies have documented habitat generalists moving into a disturbed area while habitat specialists become displaced (e.g., Ballenger and Ortega 2001, Rolando et al. 2013). Some habitat generalist species, such as crows and ravens, may also represent additional predation pressure on the resident community. Predator, meso-predator, and prey species can also be differentially affected by recreation and these dynamics can lead to altered wildlife community composition (Miller et al. 2020).

Habituation does not necessarily mean the absence of a predator-avoidance response, or lack of elevated stress in response to human disturbance. Habituation of nest return times of plovers on a beach in Spain were shorter on disturbed beaches, suggesting habituation to the human disturbance, yet the birds still flushed in response to human intrusion (Gomez-Serrano 2001). In a study that measured levels of fecal glucocorticoid metabolites (FGCMs; proxy for physiological stress) in gorillas exposed to ecotourism, habituated gorillas had higher levels of FGCM than the unhabituated group (Shutt et al. 2014). Even well-habituated gorillas remained vulnerable to variation in their exposure to humans and experienced greater stress levels when human observers violated the distance buffer they were habituated to (Shutt et al. 2014).

Habituation to the disturbance stimulus has limits, particularly in the case of dogs (Hennings 2017, Gomez-Serrano 2021). This limitation is likely related to the unpredictable, erratic behavior and movements of domestic dogs, which influences three key factors wildlife use to judge the threat of predation: predictability, proximity, and speed (Glover et al. 2011, Weston and Stankowich 2014).

Although not studied directly in Pacific pocket mice or other sensitive wildlife on the Preserve, habituation, when it occurs, is a function of response to a particular stimulus. It may be more likely to occur, if at all, when the stimulus is predictable—that is, similar in its characteristics of timing, intensity, duration, and so forth. Yet human use of a trail, even within the same schedule, offers much variation in other characteristics—including the intensity and duration of sounds, smells, movements, and vibrations. While “public presence” may be defined as an “effect”, it may reasonably be a set of potential stimuli that are not predictable because of the constantly changing composition, density, and timing while on the trail, even with all those variations occurring within a set period of time.

Some generalizations that suggest caution in relying on habituation as a mitigating factor in human disturbance to wildlife are that habituation to strong stimuli is not likely, or is less likely, to occur (e.g., Thompson and Spencer 1966); that habituation is a lowering of response and does not necessarily mean there is no cost to the response; and that habituation could be maladaptive if it is transferred to responses to other stimuli (e.g., lowering response to predators).

5. Discussion on public use and impacts

For much of the period from 2009—when the trail on the Preserve was first opened to the public—until the COVID-related substantial closure in 2020, the trail usually was open to the public seven days per week, 7:00 a.m. to sunset. However, there was no underlying research or principles that supported this amount of public access in relation to the need to protect the sensitive onsite natural resources. Indeed, the most basic principle in the field of recreational ecology—an interdisciplinary field that studies the ecological impacts of recreational activities and the management of these activities—is that if outdoor recreation is allowed in an area, impacts to that ecosystem are inevitable (D'Antonio 2020). Indeed, if the only goal pertaining to the Preserve was to protect the Pacific pocket mouse, the most protective strategy would be to prohibit public access. The Preserve is an exceedingly small area of habitat, only 29 acres, and is surrounded by development that destroyed much of the original similar habitat.

While appreciating and supporting the desire for public access, CNLM recognizes that such access is not without consequences. Although ideally and generally the visiting public is respectful of the posted Preserve rules, there are many incidents of noncompliance, some escalating to law enforcement actions. But long before they escalate to that level, and for the many that do not, there is the likelihood of natural resource impacts—that could include trampling the burrows of Pacific pocket mouse; damaging plants that serve as food sources, nesting locations, shelter, and protection for wildlife; harassment of wildlife including impacts on reproduction; and other effects. Staff resources (and with assistance from volunteers and City of Dana Point staff) are deployed to best effect to try to minimize those impacts, but pre-detection impacts, as well as those that go undetected, are not possible to eliminate. Although those public behaviors can be reduced by constant monitoring, it's not feasible to completely eliminate this behavior or these impacts.

Research results continue to grow that provide evidence of impacts from public visitation—even that which is consistent with "trail rules". An additional perspective on harmful effects from "non-consumptive" public uses (e.g., hiking) of such trails has been provided by studies that arose from the exclusion or reduction of public use of parks and natural areas during a certain stage of the COVID-19 pandemic.

Some human uses of the Preserve are arguably more important than others; and even for important uses, some are more conducive to discretion and control than others. Important uses include those related to public safety—such as police and fire response to issues in the vicinity of the Preserve. Management and monitoring activities conducted by CNLM and its agents are critical to providing support for the persistence of the natural resources onsite, including the two listed species. Research activities can sometimes be directed to other sites, but sometimes essential information can only be gained by its conduct within the Preserve. Access for the general public for walking, nature appreciation, and nature education is an important use—but also has other venues for expression besides the Preserve and can be more controlled than other important activities.

This recognition of all human uses—including those that are and are not allowed, and the relative importance—is significant because the potential for impacts from all of those uses and their impacts are cumulative, and potentially additive and interactive. Further, there are impacts from other sources (e.g., rapid climate change, Argentine ants, current and future pathogens) that are also cumulative and are not easily controlled.

Given all the influences on species in their natural environments, it is rarely possible to construct an experimental frame that allows one to test response of a species to a single variable—such as public use of a trail. It is particularly difficult to derive such direct information in a short period of time, or when rare or endangered species are involved (thus limiting the ability to manipulate and place at risk those species). However, science-based information that is relevant to guiding management of conservation areas can be reasonably gained from studies in other locations where the research can be designed more appropriately, conducted over a longer period of time, or accumulated from many sources. Indeed, selection and application of appropriate scientific principles and peer-reviewed scientific literature are the foundation of managing specific natural areas. From this literature review, there is much evidence and reason for concern about the impacts of public use of the trail.

Without additional controls, as were implemented in 2020 and continued into 2021 and 2022, public use of the Preserve was undoubtedly increasing, as reflected in trail use counter data. Average per-day use doubled over a seven-year period (2011-2017) and data from early 2020 indicated that these rates were continuing to increase. Further, plans for a boutique hotel adjacent to the Preserve could result in even higher rates of visitation by bringing a new population of visitors in close proximity of the Preserve and potentially onto the trail (Headlands Reserve LLC 2004). In addition to the potential that this or other developments has for increased number of visitors to the Preserve, there is also the potential for additional neighborhood noise and night-lighting—the latter, in particular, having been shown to negatively impact another endangered heteromyid, the Stephen’s kangaroo rat (Shier et al. 2020).

Impacts from public visitation are reasonably related to amount of use (number of visitors) and compliance (or not) with trail rules. Time of year and time of day of public use would also reasonably be related to impact on the natural resources. For example, certain wildlife species tend to be more active during periods of low light, making it potentially more impactful if the public is on site during low-light conditions (early morning, late afternoon, generally). Certain times of year (for example, corresponding with reproductive activity of certain species), may also be indicative of the potential for greater impact from the visiting public. To date, there is insufficient evidence to suggest that non-compliance is associated with certain times of the day, days of the week, or times of the year. As such, the plan for public access does not derive much guidance from that concern. However, it has been demonstrated that the amount of public use can be modified by direct control of hours of (trail) operation. As needed, the trail can also be closed (entirely, or certain sections) to protect sensitive nesting locations for gnatcatcher, or during the PPM breeding season, for example.

The trail use data in 2021-2022 provide some insight into average daily use when trail access “hours of operation” are changed. The data indicate that trail use, when limited to three days per week and eight hours per day, is considerably lower than trail visitation rates when the trail is open seven days per week, 7:00 a.m. to sunset. As discussed earlier, the control of “trail hours” has resulted in lower daily average visitation rates (than in early 2020, before additional controls were implemented) and lower weekly and annual rates, as a result. Although those data are not exhaustive in their extent, they do suggest that restricting the days and hours of trail usage can also limit the number of visitors. That is, potential visitations do not simply funnel into a smaller time period if days and hours of visitation are reduced. However, the visitation rates, when shifted to a three-day-per-week schedule, remain higher than the average per-day visitation rates in 2009—when the Preserve was first open to the public. While reduction of hours of trail operation—through a combination of days and hours-per-day that the Preserve is open to the public—has been shown to reduce number of visitors and thus likely impact, data show that reduced days and hours still allow considerable public access and at a rate similar to or greater than that in 2009 when the trail was first opened to the public.

In considering appropriate means of reducing the impacts from public use of the Preserve, the potential for habituation of wildlife species was researched and considered. That is, whether a regular and daily schedule of public use would be less impactful than some daily closures. The scientific literature is far from comprehensive on this topic and none of it is based specifically on gnatcatcher or Pacific pocket mouse. However, in both theory and in the case studies that were reviewed, there is little evidence to suggest that there would be habituation to public presence, or that the habituation, if attained, would not be impactful. Regarding the latter, habituation would not likely cancel the public effect, but, at most, reduce it. Further, habituation could be maladaptive. But most importantly, there is no reason to assume that the public presence is perceived as “one stimulus” to which any species could become habituated. The public presence is a constellation of stimuli—sights, sounds, smells, vibrations, and movements—that change over the course of the day and between days. Further, there is evidence that males and females may habituate differently, if at all. Together, there was no indication that habituation was likely or would be beneficial. As such, the value of relief from such stimuli by designating some days as having no public hours for visitation, remained as a consideration with much merit. Furthermore, this approach would allow for more influence on the degree of public visitation than could be afforded simply by reducing the number of hours per day.

In summary, the combination of increasing use of the Preserve by the public, combined with the increasing evidence of negative impacts from human use on the natural resources including the listed species onsite, strongly indicate a need for a shift in the “balance” between public use of the Preserve for recreation and aesthetic enjoyment and the protection and conservation of the threatened and endangered species and their resident and rare ecosystem. This balance is best achieved by adjusting the days and hours-within-days of operation (i.e., public trail hours) of the Preserve.

6. Public access principles and plan

To fulfill the purpose for which the Preserve was acquired and to protect and manage the resident natural resources, it is imperative that staff continue to control public access. Control is needed because of negative impacts from public access on the natural resources and the trajectory of increasing public use without changes to the hours of operations.

The intent of this plan is to consider current information towards developing a public access schedule that appropriately addresses a balance between public access and protection of sensitive (even endangered) natural resources. As reflected in the comments by wildlife agencies on the previous draft of this Update, it is important to consider modifying public access within the Preserve to ameliorate the threat that the increasing popularity of the Preserve to the public may present to the Dana Point PPM population (USFWS and CDFW 2022). To serve the dual objectives of providing reasonable public access while protecting the rare and sensitive (and, in the case of two species, endangered or threatened) species on the Dana Point Preserve, trail hours will be guided by the following objectives:

1. Reduce the impact of public visitation on the natural resources of the Preserve by controlling hours of operation.

2. Continue to provide an appropriate amount of public access—an amount that accommodates a considerable number of visitors while limiting harm to the sensitive and endangered natural resources onsite.

3. Continue to provide access for other human uses including use by first responders and researchers.

4. Enhance efforts to provide information to the public about the sensitivity of natural onsite resources, the impacts that can occur from public presence, and the reasons for controlling public access.

5. Continue to monitor public visitation for trends in behavior (compliance with trail rules) and number of visitors over time.

6. Continue to monitor relevant scientific literature and onsite biological resources and to consult with other appropriate scientists and conservation practitioners to determine relationships between public visitation and natural resource conditions.

To serve those objectives, the following plan has been developed.

1. Determine and establish hours of operation (days of week/hours per day) for the public trail using the following as guidance:

    - Avoid low-light visitation periods by providing public access well after dawn and well before dusk
    - Provide at least two “recovery days” per week when trail is closed to the public
    - Consider public input on preferred times/days (e.g., survey)
    - Consider ways to minimize the likelihood of confusion (of the public) regarding the trail hours of operation
    - Consider coincidence with schedule for Nature Interpretive Center, currently open five days per week, six hours per day (website queried 03/31/2022; https://www.danapoint.org/department/general-services/parks/natural-resources/dana-point-headlands-conservation-area/nature-interpretive-center)
    - Implement regular schedule to avoid public confusion or frustration and modify only as needed
    - Continue to implement unscheduled closures for extreme events such as unsafe trail conditions, particularly sensitive periods for natural resources, emergencies onsite or in vicinity, and similar conditions
    - “Hours Notice”: As part of adaptive management, provide trail hours to the public; Provide notification of regular hours of operation through an "Hours Notice"; Additionally, publish this information on the CNLM website and post at the Preserve

2. Revisit, revise, and implement a more robust public awareness/education program:

    - Revisit signage and education materials on and available at the Preserve to provide more information on public impacts and site sensitivity
    - Revisit lengthy lists of prohibited activities and determine if “allowed activities” list would be more effective
    - Provide more detailed information on the CNLM website regarding literature related to public impacts on natural resources

3. Conduct outreach to others who potentially use the Preserve for important activities:

    - Maintain relationships with CDFW’s Enforcement branch (i.e., Game Wardens), Orange County Sheriff’s Department, and Orange County Fire Authority regarding protection of the Preserve, emergency use, and training
    - Maintain protocol for any proposed research on the Preserve including review of research proposals for risks, conservation value, and opportunity to conduct research elsewhere; Execute research agreement for any approved research to ensure clear communication on allowed activities and to address liability
    - Consider additional outreach to underserved communities for trail access and enhanced educational experience

4. Conduct research and adaptively manage to serve the conservation values of the Preserve

    - Continue to monitor biological resources and public use
    - Determine relationships between public visitation and natural resource condition

- Adaptively manage to mitigate for known threats and impacts as well as unknown threats
- Consult with other Pacific pocket mouse experts to address specific questions about the species and the response to public use

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Appendix A. Summary of literature pertaining to biological impacts of recreational and anthropogenic disturbances.

Author	Taxa or Species	Location	Objectives	Result
Allen et al. 2021	Song sparrows (*Melospiza melodia*)	British Columbia, Canada	Experimentally manipulated fear in wild songbird populations over 3 breeding seasons by broadcasting playbacks of either predator or nonpredator vocalizations, quantified effects on components of population growth.	Fear (stimulated by predator call playback) significantly reduced population growth rate through cumulative, compounding adverse effects on fecundity and offspring survival. Parents exposed to predator playback produced 53% fewer recruits to adult breeding population. "Fear" itself was projected to halve the population size in 5 years.
Anze and Koper 2018	Savannah sparrows (*Passerculus sandwichensis*)	Alberta, Canada	Influence of anthropogenic noise (industrial Infrastructure) on anti-predator behavior.	Greatest impacts on behavior were detected at the noisiest treatment; feeding latency was shortened compared with control sites, which may expose nests to greater predation risk.
Arlettaz et al. 2007	Black grouse (*Tetrao tetrix*)	Switzerland	Evaluated the physiological stress response (corticosterone levels) after disturbance induced by snow sports.	Birds in disturbed habitat had significantly higher concentrations corticosterone metabolites than those in habitats with no/very limited human disturbance. Corticosterone did not differ between habitats with moderate vs. high human disturbance.
Banks and Bryant 2007	Birds, multiple species	Australia	Experimentally manipulated dog walking at woodland sites adjacent to urban areas and monitored response of multi-species bird assemblages.	Dog walking in woodlands led to a 35% reduction in bird diversity and 41% reduction in abundance, both in areas where dog walking is common and where dogs are prohibited.
Barber et al. 2010	Multiple species	Multiple	A review of impacts of chronic noise exposure studies on terrestrial organisms.	A broad range of findings that indicate the potential severity of this threat to diverse taxa, and recent studies that document substantial changes in foraging and anti-predator behavior, reproductive success, density, and community structure in response to noise.
Barros and Pickering 2017	Plant communities	Argentina	Impact of informal trails and off-rail use on plant communities in protected areas of high conservation value.	Vegetation in 90% of valley damaged by visitor use. Informal trails and trampling off-trail can cause landscape-scale damage.
Bateman and Fleming 2017	Multiple species	Multiple	Literature review to compare and contrast different measures of response to tourist activities (avoidance responses, time budgets, and physiological responses).	Most studies reviewed interpret data as negative impacts of tourist activities; this review finds that behavioral data (flight responses and time budgets) often indicated positive effects; time budget data are often ambiguous, while physiological data tended to show negative responses.
Beale and Monaghan 2005	Black-legged kittiwakes (*Rissa tridactyla*), common murres (*Uria aalge*)	Scotland	Examined the relationship between daily visitor numbers and daily failure rates of nests in two species of seabirds.	Daily failure rates for kittiwakes increased slightly on days with higher visitor numbers. For murres, failure rate declined seasonally but was not significantly correlated with visitor numbers.

Author	Taxa or Species	Location	Objectives	Result
Bennett et al. 2013	Karner blue butterfly (*Lycaeides melissa samuelis*)	Indiana, USA	Used field surveys and simulations to examine response of butterflies to recreation, including oviposition rate and host plant choice; tested management strategies to alleviate recreation impacts.	Butterflies were sensitive to recreational disturbance and flushed at similar speeds and distances from recreationists as they would from natural threats, such as predators. Simulation models indicated that regular disturbance could reduce egg laying potential and significantly restrict host plant choice.
Blair and Launer 1997	multiple	California, USA	Butterfly diversity and human land use; Species assemblages along an urban gradient.	Species richness and diversity of butterflies peaked at moderately disturbed sites while relative abundance decreased from natural to urban areas.
Blickley et al. 2012	Greater Sage-Grouse (*Centrocercus urophasianus*)	Wyoming, USA	Experimentally tested effects of chronic noise from human activities on sage grouse at leks.	Peak male attendance (i.e., abundance) at leks experimentally treated with anthropogenic noise from natural gas drilling and roads decreased 29% and 73%, respectively. There was limited evidence for an effect on peak female attendance.
Bötsch et al. 2017	Forest-nesting birds, multiple species	France	Measured disturbance of walking trail activity on birds during territory establishment.	Number of territories and species richness in disturbed (recreational walkers) areas substantially reduced compared with control plots (no walkers). Species most affected were open-cup nesters and above-ground foragers.
Boyes et al. 2021	Moth caterpillars (Lepidoptera)	England	Evaluated the impacts of nighttime lighting on wild caterpillars.	Street lighting strongly reduced moth caterpillar abundance compared with unlit site, affected caterpillar development, and disrupted the feeding behavior of nocturnal caterpillars.
Cassirer et al. 1992	Elk (*Cervus elaphus*)	Montana and Wyoming, USA	Measured movements of habituated and unhabituated populations of elk when disturbed by cross-country skiers to assess energy costs and identify factors that might influence elk behavior.	Among habituated elk, “predictability” of disturbance influenced response. Unhabituated elk responded similarly to skiers and logging disturbance; flight distance was related to topographic features. Elk often returned to area following displacement. Estimated energy expenditure from displacement was 5.5% of total daily expenditure, increasing exponentially with snow depth.
Cushman and Meetenmeyer 2008	Forest pathogen (*Phytophthora ramorum*)	California, USA	Examined the influence of humans and a range of environmental factors on the distribution of *P. ramorum* at three distinct spatial scales (along hiking trails, open space with public access, and human population density).	*P. ramorum* more commonly occurred in soil on hiking trails used heavily by humans than in soil from adjacent areas off trails. Forests on public land open to recreation had higher prevalence of disease than forests on private lands. Probability of disease occurrence increased significantly with population density in the surrounding area.

Author	Taxa or Species	Location	Objectives	Result
Derryberry et al. 2020	White-crowned sparrow (*Zonotrichia leucophrys*)	California, USA	Compared soundscapes and songs before and during Covid-19 shutdown; evaluated whether a songbird exploited newly emptied acoustic space.	Noise levels in urban areas were substantially lower during the shutdown, characteristic of traffic in the mid-1950s. Birds responded by producing higher performance songs at lower amplitudes, effectively maximizing communication distance and salience.
Dertien et al. 2021	Multiple species	Multiple	Reviewed research on the effect of non-consumptive recreation on wildlife to identify effect thresholds or the point at which recreation begins to exhibit behavioral or physiological change to wildlife.	Threshold distances varied substantially within and amongst taxonomic groups. Threshold distances for wading and passerine birds were <100m, but >400m for hawks and eagles. Mammal threshold distances varied widely from 50m for small rodents to 1,000m for large ungulates.
Fernández-Juricic 2001	House sparrow (*Passer domesticus*), common blackbird (*Turdus merula*), common wood pigeon (*Columba palumbus*), Eurasian magpie (*Pica pica*)	Spain	Examined factors that influence alert distances to pedestrian approaches in five large wooded open space.	Habitat structure modified alert distances: bird tolerance increased with greater availability of escape cover. Alert distances varied among species, with large species being less tolerant of human disturbance than small ones.
Ficetola et al. 2007	Terrestrial vertebrates (small mammals, birds, reptiles, and amphibians)	Italy	Examined recreation disturbance (people presence, trampling) on distribution of animals in urban parks.	Disturbance and forest maturity influenced the distribution of some species and the species richness of amphibians and reptiles; however, the pattern was not consistent across species within taxa or among taxa.
Finney et al. 2005	Golden plover (*Pluvialis apricaria*)	United Kingdom	Impact of recreational disturbance (intensity and extent) on the distribution and reproductive success of plovers breeding in proximity to an intensively used trail.	Prior to trail resurfacing, when people strayed from the footpath, plovers avoided areas within 200m of the trail during chick-rearing. After trail resurfacing, >96% of walkers remained on-trail, and plovers avoided areas within only 50m of the footpath. No detectable impact of disturbance on reproductive performance.
Frid and Dill 2002	Multiple species	Multiple	A review of studies where predation and nonlethal disturbance stimuli are proposed to create similar trade-offs between avoiding perceived risk and fitness-enhancing activities (feeding, parental care, mating); provide theoretical framework for human-caused disturbance stimuli as a form of predation risk.	Most literature examples were consistent with predictions of the risk-disturbance hypothesis (human-caused disturbance stimuli as a form of predation risk).

Author	Taxa or Species	Location	Objectives	Result
George and Crooks 2006	Bobcat (*Lynx rufus*), coyote (*Canis latrans*), and mule deer (*Odocoileus hemionus*)	California, USA	Investigated the relationship between large mammal spatial and temporal activity patterns and human recreation in an urban nature reserve using camera trapping.	Bobcats, and to a lesser degree coyotes, exhibited both spatial and temporal displacement in response to human recreation. No effect was detected for mule deer.
Glover et al. 2011	Shorebirds, multiple species	Australia	Measured the distance at which a response (flight initiation distance [FID]) occurred among 28 shorebird species when presented with an approaching human.	FID differed by species; species with higher body masses had longer FIDs. Mean FIDs for species were 18.6–126m. FID was influenced by starting distance of human approach, flock size, previous exposure to humans, and stimulus type (walker, jogger, walker with dog).
Gomez-Serrano 2021	Kentish plover (*Charadrius alexandrines*)	Spain	Estimated the impact of human presence affects breeding birds.	Walkers, when accompanied by dogs flushed plovers 80-93% of the time, whereas pedestrians alone flushed plovers 13-47.6% of the time. Nest return times were shorter on disturbed beaches, suggesting habituation to the human disturbance.
Gutzwiller et al. 1994	Birds, multiple species	Wyoming, USA	Effects of human intrusion on song occurrence and singing consistency in subalpine birds.	Singing by several species was not influenced by intrusion. For some species, song occurrence and singing consistency were higher on controls than on intruded sites, indicating intrusion reduced singing activity.
Habib et al. 2007	Ovenbirds (*Seiurus aurocapillain*)	Alberta, Canada	Assessed pairing success and age distribution of birds in boreal forests around noise-generating compressor stations compared with areas around habitat-disturbed, but noiseless, wellpads.	Significant reduction in ovenbird pairing success at compressor sites compared with noiseless sites. Significantly more inexperienced birds breeding for the first time were found near noise-generating compressor stations than noiseless well pads.
Hennings 2016, 2017	Multiple species	Multiple	This document reviews the literature on overall and relative effects of three user groups – hikers, mountain bikers and equestrians – on trails, habitat, and wildlife to help inform ecologically appropriate placement and construction of trails in natural areas.	Trails and trail use can damage natural areas by negatively affecting soils, vegetation, water quality, plants, and animals. Human disturbance increases animals' stress and can cause them to hide, change behavior or flee. Some species, such as those that do well in urban areas, are generalists and can tolerate human disturbance. Other species such as pregnant animals, long-distance migrants, and habitat specialists tend to be more stressed and displaced by trail users. Some species may permanently leave a natural area. A 2016 review specific to dog impacts on wildlife and water quality is included as Appendix 1.

Author	Taxa or Species	Location	Objectives	Result
Kangas et al. 2010	Birds, multiple species	Finland	Examined effects of recreation on forest bird communities in protected areas. Bird data collected along hiking trails and in undisturbed control areas were related to number of visits, area of tourism infrastructure, and habitat variables.	Results indicate that number of visits affects occurrence and composition of bird communities, but not species richness. Open-cup nesters breeding on ground showed strongest negative response to visitor pressure, while open-cup nesters in trees/shrubs were more tolerant. No significant impact detected for cavity-nesting birds.
Larson et al. 2016	Multiple species	Global	Conducted a systematic review of the scientific literature and analyzed 274 articles on the effects of non-consumptive recreation on animals, across all geographic areas, taxonomic groups, and recreation activities. Quantified trends in publication rates and outlets, identified knowledge gaps, and assessed evidence for effects of recreation.	Over 93% of reviewed articles documented at least one effect of recreation on animals, the majority of which (59%) were classified as negative. Studies of amphibians, reptiles, and fish are lacking. Some taxonomic groups (e.g., raptors, shorebirds, ungulates, and corals) had greater evidence for an effect of recreation. Non-motorized activities had more evidence for a negative effect of recreation than motorized activities, with effects observed 1.2 times more frequently.
Larson et al. 2018	Multiple species and subspecies of conservation concern in southern Ca.	California, USA	Modeled visitation rates for regional preserves, exposure of sensitive species, factors driving visitation rates.	Accessibility (numbers of housing units and parking lots) had positive relationships with visitation rates. Orange-throated whiptail (*Aspidoscelis hyperythra*), western spadefoot (*Spea hammondii*), and coastal California gnatcatcher (*Polioptila californica californica*), are likely exposed to high levels of recreational activity.
Larson et al. 2019	Birds, mammals, reptiles	Global	Conducted a global meta-analysis of the effects of recreation on vertebrate richness and abundance. Included 34 articles.	Species richness and abundance were lower in association with higher levels of recreation. In approximately 7 of 10 comparisons, vertebrate richness or abundance is expected to be lower with higher levels of recreation.
Liedtke et al. 2020	Native and non-native plants, multiple species	Chile	Evaluated the importance of hiking trails for plant invasion in protected mountain areas.	Hiking trails foster non-native species (NN) spread into mountains; NN at higher elevations are a subset of the lowland source pool and NN number and cover decreases with increasing elevation and distance to trails.
Lucas 2020 (*in* CDFW 2020)	Multiple species	Multiple locations	A literature review of recreation-related disturbances to wildlife; explores sustainability of dual-role preservation area (those used for conservation and recreation).	Evidence from literature indicates incompatibility between recreation and conservation goals of dual-role protected areas.
Mitrovich et al. 2020 (*in* CDFW 2020)	Multiple species	USA	Review of effects of recreation on wildlife; Case study of recreation-wildlife conflicts; discussion of options to balance human interest for recreation and the impacts on wildlife.	Authors provide comprehensive list of recommendations to achieve best recreation and conservation outcomes and minimize negative impacts of recreation.

Author	Taxa or Species	Location	Objectives	Result
Mallord et al. 2007	Woodlark (*Lullula arborea*)	England	Impact of recreational disturbance on population size	Bird density lower on sites with more disturbance. Probability of suitable habitat being colonized s lower in areas with greater disturbance. No relationship between disturbance and daily nest survival rates. Birds on heaths with higher levels of disturbance fledged more chicks (per pair) because of a strong density-dependent increase in reproductive output.
Martin and Réale 2008	Eastern chipmunks (*Tamias striatus*)	Quebec, Canada	Investigated the relationship between exploration, grooming-scanning continuum, emotionality, and docility of individual chipmunks and location of their burrow respective to frequentation by humans; assessed the relationship between hair cortisol and both temperament and frequentation by humans.	Explorative or docile chipmunks were more common in frequented areas. Hair cortisol increased with docility but was not related to human frequentation, indicating that temperament may cause animals to distribute themselves in a non-random way in response to human disturbance.
Miller et al. 2001	Birds, multiple species; Mule deer (*Odocoileus hemionus*)	Colorado, USA	Assessed the “area of influence” for human disturbance treatment by determining the probability that an animal would flush or become alert (for mule deer only).	For mule deer, the presence of a dog resulted in a greater area of influence, alert and flush distance, and distance moved than when a pedestrian was alone while for grassland and forest birds, the reaction to dogs and people were similar.
Miller and Hobbs 2000	Birds (artificial nests), multiple species	Colorado, USA	Effect of recreational trails on the risk of nest predation and nest predator activity at lowland riparian sites.	Predation rates were high (94%). Vulnerability to predation differed by transect types (on-trail, off-trail, near trail); predation rates tended to increase with distance from trails. Birds predators were more common near trails than away from trails, whereas mammals appeared to avoid nests near trails.
Naylor et al. 2009	American elk (*Cervus elaphus*)	Oregon, USA	Measured responses of elk (*Cervus elaphus*) to motorized and nonmotorized off-road recreational disturbance (ATV, mountain biking, horseback riding, hiking).	Elk increased their travel time in response to all disturbance types especially ATVs, followed by mountain biking, hiking, and horseback riding. Feeding time decreased during ATV exposure and resting decreased when elk were subjected to mountain biking and hiking disturbance.
Papouchis et al. 2001	Desert bighorn sheep (*Ovis canadensis nelsoni*)	Utah, USA	Compared behavioral responses of sheep to recreational activity between a low visitor use area and a high visitor use area by observing behavioral responses, distances moved, and duration of responses to vehicles, mountain bikers, and humans on foot.	Hikers caused more severe disturbance than vehicles and mountain bikers. There was considerable individual heterogeneity in responses, as well as differences in responses by male and females depending on breeding status. Avoidance of road corridor by some animals represented 15% less use of potential suitable habitat.

Author	Taxa or Species	Location	Objectives	Result
Patton et al. 2019	Mammals, multiple species	California, USA	Examined diel shifts in response to human activity; implication for predator-prey dynamics.	Two species, one predator and one prey, avoid human activity via a temporal shift to become more nocturnal—activity was centered near dawn on days without human activity but nearer to midnight on days with human activity.
Persons and Eason 2017	White-footed mice (*Peromyscus leucopus*)	Kentucky, USA	Effects of habitat and abiotic factors, and human presence on anti-predator behavior of mice foraging in an urban park.	Increased human presence negatively affected foraging behavior across treatments. Human presence and light pollution led to modification of foraging behavior.
Reed and Merenlender 2008	Mammalian carnivores, multiple species	California, USA	Combined noninvasive survey techniques and DNA verification of species identifications to survey for mammalian carnivores in 28 parks and preserves.	Paired comparisons of neighboring protected areas with and without recreation show that presence of dispersed, nonmotorized recreation led to a five-fold decline in the density of native carnivores and a substantial shift in community composition from native to nonnative species.
Reilley et al. 2017	Mountain lion (*Puma concolor*), Virginia opossum (*Didelphis virginiana*), coyote (*Canis latrans*), striped skunk (*Mephitis mephitis*)	California, USA	Used camera traps to quantify habitat use and activity patterns of wild mammals and human recreationists in protected areas; modeled habitat use with a multi-species occupancy model.	Habitat use was most associated with environmental covariates. Domestic dog presence was negatively associated with habitat use of mountain lions and opossum. Coyotes were more active at night/less active during day in areas with high levels of recreation. Skunks were more active in late morning in areas with human recreation. Smaller nocturnal carnivores may not be directly affected by daytime recreational activities.
Rolando et al. 2013	Multiple species	Italy	Quantify effects of effect of ski-pistes on birds and small mammals.	Ski-pistes below tree line produce a negative edge effect and were associated with lower bird diversity and species richness; forest plots adjacent to ski-pistes had lower bird abundance; small forest mammals avoid ski-pistes, but open habitat species colonized them.
Rutz et al. 2020	Multiple species	Global	Discussion of COVID-19 lockdown effects on wildlife and the opportunity this presents for researchers to quantify the effects of human activity on wildlife.	Reduction in human mobility during Covid-19 shutdown (“Anthropause”) is unparalleled. Anecdotal observations show wildlife responded by increased movement into new places, etc. Authors encourage and discuss how collaborative research on Anthropause effects can maximize scientific insight and enable detailed, mechanistic understanding of human-wildlife interactions.

Author	Taxa or Species	Location	Objectives	Result
Schroeder et al. 2012	House sparrow (*Passer domesticus*)	United Kingdom	Examined how noise might reduce reproductive output in passerine birds: e.g., by impairing mate choice, by reducing territory quality, and/or by impeding chick development.	Nests in areas affected by noise from large generators produced fewer young, of lower body mass, and fewer recruits; females nesting in noisy areas fed young less often. Nest box occupancy, parental body mass, age and reproductive investment did not differ significantly between noisy and quiet areas.
Schrimpf et al. 2021	Birds, multiple species	Canada and USA	Used records of >4.3 million birds observed by volunteers from March to May 2017-2020 to examine how reduced human activity during COVID-19 altered avian land use.	Counts of 80% of focal bird species changed in pandemic-altered areas, usually increasing in comparison to pre-pandemic abundances in urban habitat, near major roads and airports, and in counties where lockdowns were more pronounced or concurrent with peak bird migration.
Shier et al. 2012	Stephen's kangaroo rat (*Dipodomys stephensi*; SKR)	California, USA	Examined response of SKR to playbacks of footdrumming overlaid with experimental and control background noises.	Spectral characteristics of traffic noise overlap extensively with footdrumming signals of SKR. Traffic noise masks, and may mimic, footdrumming signals. Results suggest that anthropogenic noise may function as a deceptive signal.
Shier et al. 2020	Stephen's kangaroo rat (*Dipodomys stephensi*)	California, USA	Impacts of artificial light at night (ALAN) on foraging decisions of kangaroo rats.	Artificial light negatively impacted foraging decisions of endangered kangaroo rats; ALAN reduces habitat suitability and may potentially impede the recovery of at-risk nocturnal rodents.
Shutt et al. 2014	Western lowland gorillas (*Gorilla gorilla gorilla*)	Central African Republic	Investigated effects of ecotourism on the faecal glucocorticoid metabolites (FGCM) response of wild gorillas.	Two out of three human-contacted groups had higher FGCMs than unhabituated gorillas. FGCMs increased in between contacts up to 21 days in gorillas under habituation.
Slabbekoorn and Ripmeester 2008	Great tits (*Parus major*); additional songbird species covered in review	Western Europe	Reviewed current evidence for whether and how anthropogenic noise plays a role in patterns of decline in bird diversity and density.	Omnipresence of anthropogenic sounds can negatively affect birds. Behavioral flexibility, such as song plasticity, may allow some species more time to adapt to human-altered environments.
Steven et al. 2011	Birds, multiple species	Global	A review of the recreation ecology literature published in academic journals.	Of 69 papers (1978-2010) that examined recreation effects on birds, 61(88%) found negative impacts, including changes in physiology, immediate behavior, changes in abundance, and reproductive success.
Sun and Liddle 1993	Vegetation	Australia	Examined impacts of recreation (vehicles and walkers) on plant species richness, vegetation characteristics, soil penetration, and soil organic matter.	Plant species differed in sensitivity to degrees of trampling. Woody plants occurred only on untrampled areas. Total species and vegetation height and cover were reduced as wear increased. Plant height was reduced dramatically by even light trampling. No clear relationship between soil organic matter content and trampling intensity.

Author	Taxa or Species	Location	Objectives	Result
Taylor and Knight 2003	Bison (*Bison bison*), mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra americana*)	Utah, USA	Measured responses of animals to hikers and mountain bikers at a state park by comparing alert distance, flight distance, and distance moved.	Based on a 200-m “area of influence” (7%) of park was potentially unsuitable for wildlife due to disturbance from recreation. Wildlife did not respond differently to mountain biking vs. hiking; there was a negative relationship between wildlife body size and response.
Thompson 2015	Birds, multiple species	Ontario, Canada	Impacts of recreational trails on a forest-dwelling bird community.	Significant positive influence of the area of trail-free habitat on bird density, but not species richness. Birds that nest or forage on the ground exhibited greatest response to presence of recreational trails.
Tost et al. 2020	Black grouse (*Tetrao tetrix*)	Germany	Trail use and activity impacts on habitat use of an endangered grouse.	Birds avoided the vicinity of public routes at distances directly related to intensity of human activity. Recreational disturbances appeared to significantly affect the effective habitat availability.
Wells et al. 2012	Native and non-native plants, multiple species	Colorado, USA	Examined distribution of alien plants at trailheads and trails.	Plant communities at trailheads and trails, and seed banks at trailheads, contain substantial diversity and abundance of non-native plants. Recreational trails may function as corridors that facilitate the spread of non-native species into wildlands.
Weston and Stankowich 2014	Multiple species	Global	This book chapter reviews evidence of disturbance to wildlife caused by dogs not accompanied by humans.	Summary of evidence from literature of dog disturbance on wild birds and mammals, as well as reptilian and amphibian species. Provides management recommendations.
Wheat and Wilmers 2016	Brown bears (*Ursus arctos*)	Alaska, USA	Tested how habituation and fear drive the foraging ecology of bears feeding on salmon.	Higher human activity was associated with increased nocturnality of non-habituated bears, likely leading to suboptimal foraging, but had no effect on habituated individuals.

EXHIBIT 4

Headlands Conservation Area Trail System

Trail System

A public trail system, approximately three miles in length, links all of the conservation parks and public open space areas of the Headlands. The system includes pedestrian trails, coastal and beach access, scenic overlooks, and the Nature Interpretive Center. The trails maximize public coastal access and ocean view opportunities, while conserving the extremely rare resources on the Headlands. These trails implement the policies and guidelines of the Dana Point General Plan and the Local Coastal Plan and provide a comprehensive system that reinforces the relationship between the Headlands, the beaches, the Dana Point Harbor and the Pacific Ocean. To view more information about any of the parks within this trail system, click the links below:

- Hilltop Conservation Park
- Harbor Point Conservation Park
- Dana Point Preserve (LIMITEDLY OPEN)
- South Strands Conservation Park

Trail and Park Hours

The parks and trails can be reached either off of Green Lantern or at Dana Strand Rd. (terminus of Selva Rd.), with limited parking available along these streets or at the Nature Interpretive Center parking lot.

Harbor Point, Hilltop, and South Strands Switchback are open from 7 a.m. to SUNSET daily.

CNLM owned and managed Dana Point Preserve trail is limitedly open due to COVID-19. See page for details.

Trail Closure Policy

In order to protect the sustainability of our trails and keep visitors from harm, all trails may be closed for up to 72 hours following a significant rain event.

Foot traffic during wet and muddy conditions can cause irreversible damage and erosion to the trail and surrounding vegetation. The trails will remain closed until it is determined that the trails have dried enough to be safely reopened.

It is our goal to provide our residents with safe, enjoyable and quality access to the natural and recreational resources within the City of Dana Point while also practicing practical, sustainable and efficient methods to maintain our trails.

There are no pets allowed on any Dana Point Headlands Conservation Area trail.

Dana Point Preserve

Location

About

A beautiful 0.5 mile trail along the Dana Point Headlands. Managed by the Center for Natural Lands Management, This preserve is part of the Dana Point Headlands Conservation Area.

CNLM DANA POINT PRESERVE WEBSITE

CNLM's Dana Point Preserve Trail is open to the public Tuesday, Thursday, and Saturday, from 08:00 AM to 4:00 PM.

UPDATE

- Effective May 25, 2021- The Dana Point Trail will be open to two-way foot traffic, visitors may enter the trail at either the terminus of Scenic Dr. or Selva Rd.
- Effective June 8, 2021- The Dana Point Trail will be open 08:00 AM – 4:00 PM Tuesday, Thursday and Saturday.

For current trail guidelines, click, here.

Amenities

- Restricted due to COVID-19; see messaging
- Benches
- Scenic Views
- Trail Type: Dirt
- **PLEASE NO DOGS ON TRAIL**

Dana Point Headlands Conservation Area

Background

Development of the Headlands project site was carefully planned to enhance the public coastal access, provide a range of passive recreational opportunities, preserve the coastal bluffs and other significant landforms and conserve sensitive habitat. The public open space, parks and greenbelt linkages comprise approximately half of the development site.

The primary goals for the conservation parks were to:

1. Create high quality public parks, recreation and open space areas that maximize coastal access, establish and preserve public views and conserve natural resources including the preservation and enhancement of environmentally sensitive habitat areas.
2. Interconnect the public parks and open space by establishing an integrated public trail/access system that links to other trail alignments off site.
3. Encourage public visitors to utilize the parks and open space by implementing a series of scenic overlooks, informational signage, public art, and public visitor recreational facilities that provide a variety of educational, historical, natural and conservation programs.

The four conservation parks that comprise the nearly 60 acres of the Headlands are Harbor Point Conservation Park, Dana Point Preserve, Hilltop Conservation Park, and South Strands Conservation Park. The Dana Point Preserve is owned and managed by the non-profit Center for Natural Lands Management (CNLM) who's main objective is to protect the imperiled Pacific Pocket Mouse, a Federally Endangered Species with numbers likely near about 500 left in the wild as of 2014.

Habitat

The Dana Point Headlands Conservation Area contains over 150 species of plants and animals that are native to coastal Southern California. Several rare and indigenous plant communities are found on the site, including; southern coastal bluff scrub, native grasslands, maritime succulent scrub, mixed chaparral, and coastal sage scrub. The unique setting and mix of habitats on the Headlands also provides a home for rare and threatened plants and animals. The Headlands are home to the Federally listed Pacific Pocket Mouse and Coastal California Gnatcatcher.

A public trail system, approximately three miles in length, links all the conservation parks and public open space areas of the Headlands. The system includes pedestrian trails, coastal and beach access, scenic overlooks, and the Nature Interpretive Center.

No pets are allowed on any Dana Point Headlands Conservation Area trails.

EXHIBIT 5


PUBLIC PARKING
P
HEADLANDS
Conservation Area
Welcome to the
Dana Point Headlands Conservation Area
NATURE INTERPRETIVE CENTER HOURS
CLOSED ON MONDAYS
7 AM – 4 PM
CITY TRAILS & PARKING LOT HOURS
7 AM – SUNSET
CNLM DANA POINT PRESERVE TRAIL
TUES, THURS, SAT
8 AM – 4 PM
Headlands
VISTA POINT
& TRAILS
S033
33°27'41", -117°42'40", 33.5m, 328°
24/08/2022 07:49:40

EXHIBIT 6

U.S. FISH AND WILDLIFE SERVICE
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

CALIFORNIA DEPARTMENT OF
FISH AND WILDLIFE
South Coast Region
3883 Ruffin Road
San Diego, California 92123

In Reply Refer to:
FWS/CDFW-OR-2022-0016223

March 23, 2022
Sent Electronically

Deborah L. Rogers
Co-Executive Director and Director of Conservation Science and Stewardship
Center for Natural Lands Management
27258 Via Industria, Suite B
Temecula, California 92590-3751

Subject: Update to the Habitat Management and Monitoring Plan for Dana Point Headlands Biological Open Space, City of Dana Point, California

Dear Deborah Rogers:

This letter responds to the "Draft Update to the Habitat Management and Monitoring Plan [HMMP] for the Dana Point Headlands Biological Open Space" dated January 28, 2022, that has been prepared by the Center of Natural Lands Management (CNLM) to address a proposed change to public access policies for the Dana Point Preserve (also known as the Headlands Conservation Park; hereafter "Preserve") that is owned and managed by CNLM.

History of the Preserve and the HMMP

The original HMMP (URS and CNLM 2005) was prepared in association with the City of Dana Point's development approval for the Headlands Development and Conservation Plan (HDCP), which included amending the Dana Point Local Coastal Program to accommodate residential and visitor/recreational commercial land uses along with the establishment of 34 acres of Conservation Open Space and 34.5 acres of Recreation Open Space on the overall 121-acre Dana Point Headlands Property. Because the HDCP project proponent and former landowner of the Preserve is a "Participating Landowner" to the Orange County Central and Coastal Subregions Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP), the HDCP and associated HMMP were also prepared to conform to the requirements of the NCCP/HCP, which addresses impacts to and conservation of the federally endangered Pacific pocket mouse (*Perognathus longimembris pacificus*; PPM), federally threatened coastal California gnatcatcher (*Polioptila californica californica*), and other "Identified Species" throughout much of Central and Coastal Orange County, including the Dana Point Headlands property.

Among the provisions of the NCCP/HCP was a commitment by the landowners to grant the U.S. Fish and Wildlife Service (Service) and the California Department of Fish and Wildlife (Department)—jointly the Wildlife Agencies—an option to purchase a 22-acre portion of the Dana Point Headlands property designated as a "Temporary Pacific Pocket Mouse Preserve" should the Wildlife Agencies determine that "…continuance of the preserve is necessary to

ensure the survival and recovery of the species [PPM]" (NCCP/HCP Implementation Agreement Section 8.3.2 (a)(1)(F), pp. 85-86). Ultimately, the Wildlife Agencies waived our purchase option and supported approval of the HDCP based on the proposal to include as components of the HDCP the acquisition and permanent preservation of the Temporary Pacific Pocket Mouse Preserve by the Harry and Grace Steele Foundation and a commitment to manage this area in perpetuity for conservation purposes. These commitments were realized via the transfer of funds from the Harry and Grace Steele Foundation to CNLM to purchase and manage the Temporary Pocket Mouse Preserve and the establishment of a Conservation Easement (CE) to protect this property in perpetuity.

To help ensure that the CE is enforced, and its biological values and resources are maintained, the Wildlife Agencies are named as Third Party Beneficiaries to the CE, and CNLM has an obligation to periodically update the HMMP that helps govern uses within the CE "…consistent with best adaptive management practices and in consultation and coordination with [the Wildlife Agencies]" (Conservation Easement Section 5.1). Accordingly, you have requested that the Wildlife Agencies review and comment on the proposal to update the HMMP, which seeks to update the policies governing controlled public access to develop "…a public access schedule that more appropriately addresses a balance between public access and protection of sensitive (even endangered) natural resources" (HMMP Update, p. 24). Based on the status of PPM within the Preserve and the available information regarding the potential effects of outdoor recreation on wildlife, we support the proposed changes to the public access schedule, but we acknowledge that additional information regarding the effects of trail use on PPM in adjacent habitat would help inform future management of public access. Additional reasoning is provided below.

Status of PPM in the Preserve

Monitoring of PPM within the Preserve has documented dramatic fluctuations in the PPM population. Since the re-discovery of PPM in 1993, several comprehensive live-trapping efforts in the Preserve have detected fewer than 10 animals. There have also been two documented peaks in abundance. The first peak occurred in 2009 when 82 individuals were captured in May of that year (Brylski *et al*. 2010), following several years of habitat management and just prior to the Preserve being opened to public access. After 2009, the population began to decline, and by 2017 a comprehensive live-trapping effort detected just six individuals (Miller 2017).

Following the very low population numbers documented in 2017, we worked closely with CNLM to increase its capacity to manage habitat and increase the abundance of PPM within the Preserve. Through grant funding provided to CNLM by the Service, from December of 2019 through February of 2020, CNLM was able to create the more open habitat conditions preferred by PPM within 4.3 acres of the Preserve by removing dead shrubs, woody debris, leaf litter, and duff. Subsequent results from live-trapping surveys performed in June and July of 2020 were encouraging, with the capture of 77 mice suggesting the population rebounded and responded positively to the habitat management effort (Brehme *et al*. 2021).

However, as noted in the proposed modification to the HMMP, it is challenging to attribute the observed fluctuations in the PPM population to any single factor. Between 2009 and 2017, when

public visitation within the Preserve was increasing and the PPM population was in decline, there were also periods of drought and changes in the age structure and composition of the vegetation community. Following the 2019–2020 habitat management efforts and the observed increase of the PPM population, there was no public access allowed within the Preserve (see "Public Access in the Preserve" below). Regardless of the cause of the observed fluctuations in the PPM population, the monitoring results clearly illustrate that this population remains vulnerable to extirpation due to its isolation and small population size.

Additionally, even with the apparent rebound in numbers of mice within the Preserve, genetic studies suggest the Dana Point population has suffered a severe loss of genetic variation since its rediscovery (Swei *et al*. 2003; Wilder *et al*. 2020), likely associated with the population going through bottlenecks such as that observed in 2017. Loss of genetic variation increases the risk of extirpation of small populations because it results in the loss of adaptive potential (i.e., the ability of a species to evolve and adapt in response to changing conditions) and can lead to inbreeding depression (reduced fitness resulting from mating between close relatives; Franklin 1980). Thus, another focus of our efforts to recover PPM at Dana Point and elsewhere has been to formulate a genetic management strategy for the species.

Because the Dana Point population is genetically differentiated from the other two extant populations on Marine Corps Base Camp Pendleton (Swei *et al*. 2003; Wilder *et al*. 2020), and mice at Dana Point may have a different chromosome number than mice on Camp Pendleton (Shier and King 2020), significant questions remain whether it is appropriate to pursue genetic rescue (i.e., augment genetic variation within a population by outcrossing with individuals from another population) at Dana Point for fear of introducing outbreeding depression (decreased fitness of progeny from crosses between divergent populations). This underscores how critical it is to conserve the remaining genetic variation within the Dana Point population by maximizing the size of this population and preventing further bottlenecks while additional studies are performed to inform the genetic management strategy.

Public Access in the Preserve

When we provided our support for the HDCP, we did so with the understanding that the public would be granted controlled access to a trail constructed within the Preserve. Due to the small size and sensitivity of the PPM population, during development of the HDCP and HMMP we emphasized that it would be critical to design and regulate public use to safeguard PPM and other sensitive flora and fauna within the Preserve. Among the provisions incorporated in the HDCP and HMMP to address this concern were: fencing the perimeter of the Preserve, placing lockable gates at the trail heads, aligning and minimizing the width of the trail to minimize impacts to sensitive resources, fencing the trail alignment to discourage off-trail use, prohibiting the public from bringing dogs within the Preserve, and restricting public use of the trail to daytime hours. The HMMP further contemplated that the Habitat Manager (CNLM) would monitor public access and its consequences within the Preserve and would apply adaptive management to minimize impacts to individuals or populations of NCCP/HCP Identified Species from public access (URS and CNLM 2005).

To assist CNLM monitor public visitation to the Preserve, during 2010 we worked with the Natural Communities Coalition (the non-profit entity that helps oversee implementation of the NCCP/HCP) to fund the acquisition of trail counters to place at each of the trail heads. Public visitation data collected by CNLM since 2010 shows that the popularity of the Preserve has grown appreciably, with the estimated number of annual visitors nearly doubling between 2011 and 2017 to almost 250,000 visitors per year.

As discussed in the proposed modification to the HMMP, human disturbance of wildlife from non-consumptive recreation (e.g., hiking) can cause altered spatio-temporal habitat use, decreased survival and reproduction, reduced population abundance, and extirpation of animals from otherwise suitable habitat (see review by Dertien *et al*. 2021). Thus, it is important to consider modifying public access within the Preserve to ameliorate the threat that the increasing popularity of the Preserve to the public may present to the Dana Point PPM population. The status of this population further suggests a conservative management strategy is warranted that focuses on ameliorating all potential threats to this population, including recreation use, habitat senescence, Argentine ants, and other factors discussed in the HMMP update.

Adaptive Management of the Preserve

The Wildlife Agencies supported the HDCP based on the proposal to permanently preserve the Temporary Pacific Pocket Mouse Preserve and manage this area and its resources using adaptive management principles, which we determined would help promote the survival and recovery of PPM. Adaptive management makes use of management interventions and follow up monitoring to improve understanding of how a resource system works and improve subsequent decisions to help achieve management objectives. In developing the proposal to reduce public access to benefit sensitive resources within the Preserve, CNLM has considered the monitoring data on public use, the dynamics of the PPM population before and after restriction of public access to the Preserve due to COVID-19, and the growing body of scientific literature that indicates that even passive non-consumptive recreation can have deleterious effects on wildlife individuals and populations. Looking forward, we recommend that CNLM work with the Wildlife Agencies and others to determine how the existing monitoring program might be adjusted to better study the effects of trail use on PPM and other sensitive species. Refining the PPM monitoring methodology to use track tubes and live trapping to more frequently estimate PPM distribution and abundance on the Preserve, including documenting any changes in PPM distribution during days that the public is using the trail and days that they are not, should provide the information necessary to allow CNLM to continue to adjust public access and management effort in response to the changes in PPM populations and to adaptively manage the Preserve.

We recognize that providing the public access to nature is important for maintaining support for conservation efforts and that many members of the public will have an interest in the level of public access in the Preserve. Thus, our support for CNLM's proposed modification to the HMMP is based on the current status of the Dana Point PPM population and of the species as whole, which warrants a conservative management strategy within each of the extant populations. However, we wish to emphasize the importance of accompanying this management change with implementation of a more robust public outreach and education program that includes the use of

augmented signage and information displays. We also recommend implementing an updated species-specific monitoring plan to help address remaining questions about the effects of public access and other questions of concern to PPM management and recovery. The Wildlife Agencies are available to assist CNLM with an update to the species monitoring component of the HMMP.

Finally, we note that the plan includes guidance for establishing hours of operation (days of week/hours per day) for the public access trail but does not specify what those hours will be. We recommend including a figure that explicitly identifies the location of the trail where public access is permitted and a discussion of other allowable and prohibited public uses in the Preserve (e.g., access for pets or use of drones). To avoid confusion or different interpretations of allowable public use, we recommend these items be included as a component of the update to the HMMP.

We appreciate the opportunity to comment on the draft update to the HMMP and CNLM's management of the Preserve. We look forward to continuing to work cooperatively with CNLM to adaptively manage the Preserve and public access to continue to benefit PPM. Should you have questions or wish to discuss any of the above, please contact William Miller[1] with the Service at 760-431-9440, extension 206, or Emily Gray[2] of the Department.

Sincerely,

JONATHAN SNYDER Digitally signed by JONATHAN SNYDER Date: 2022.03.23 12:04:02 -07'00'

Jonathan D. Snyder
Assistant Field Supervisor
U.S. Fish and Wildlife Service

DocuSigned by:
David Mayer
D700B4520375406...
3/23/2022

David A. Mayer
Environmental Program Manager
California Department of Fish and Wildlife

cc:
Jeff Rosaler, City of Dana Point
Korie Merrill, CNLM

[1] william_b_miller@fws.gov
[2] emily.gray@wildlife.ca.gov

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<u>PROOF OF SERVICE</u>

***Center for Natural Lands Management v. City of Dana Point*, and Cross Action, Superior Court of Orange County Case No. 30-2021-01219668-CU-OR-CJC**

STATE OF CALIFORNIA, COUNTY OF ALAMEDA

At the time of service, I was over 18 years of age and not a party to this action. I am employed in the County of Alameda, State of California. My business address is 1999 Harrison Street, 9th Floor, Oakland, CA 94612.

On September 6, 2022, I served true copies of the following document(s) described as **FURTHER DECLARATION OF DEBORAH L. ROGERS, PH.D., IN OPPOSITION TO CITY OF DANA POINT'S MOTION FOR PRELIMINARY INJUNCTION** on the interested parties in this action as follows:

Patrick Munoz, Esq. Jennifer Farrell, Esq. Robert Owen, Esq. RUTAN & TUCKER LLP 18575 Jamboree Road, 9th Floor Irvine, CA 92612	Attorneys for Defendant and Cross-Complainant CITY OF DANA POINT Telephone: (714) 641-5100 Facsimile: (714) 546-9035 Email: pmunoz@rutan.com jfarrell@rutan.com bowen@rutan.com

BY ELECTRONIC SERVICE: I electronically filed the document(s) with the Clerk of the Court by using the One Legal system. Participants in the case who are registered users will be served by the One Legal system. Participants in the case who are not registered users will be served by mail or by other means permitted by the court rules.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on September 6, 2022, at Oakland, California.

MBender

Melissa Bender

SHAYE DIVELEY (SBN: 215602)
sdiveley@meyersnave.com
RUSSELL E. MORSE (SBN: 251057)
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MEYERS NAVE
1999 Harrison Street, 9th Floor
Oakland, California 94612
Telephone: (510) 808-2000
Facsimile: (510) 444-1108

Attorneys for Plaintiff and Cross-Defendant
CENTER FOR NATURAL LANDS
MANAGEMENT

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF ORANGE

CENTER FOR NATURAL LANDS MANAGEMENT, a non-profit organization,

Plaintiff and Cross-Defendant,

v.

CITY OF DANA POINT; and DOES 1-50,

Defendants.

CITY OF DANA POINT,

Cross-Complainant,

v.

CENTER FOR NATURAL LANDS MANAGEMENT,

Cross-Defendant.

Case No. 30-2021-01219668-CU-OR-CJC

ASSIGNED FOR ALL PURPOSES TO: MICHAEL STRICKROTH, DEPARTMENT C15

DECLARATION OF DEBORAH L. ROGERS, PH.D., IN SUPPORT OF OBJECTIONS TO [PROPOSED] ORDER GRANTING PRELIMINARY INJUNCTION

Action Filed: September 7, 2021
Trial Date: None Set

DECLARATION OF DEBORAH L. ROGERS, Ph.D.

I, DEBORAH L. ROGERS, declare as follows:

1. I am a party in the above-entitled action. I have personal knowledge of the facts set forth herein, except as to those stated on information and belief and, as to those, I am informed and believe them to be true. If called as a witness, I could and would competently testify to the matters stated herein.

2. I am Co-Executive Director and Director of Conservation Science and Stewardship at the Center for Natural Lands Management ("CNLM" or "Center"), a non-profit organization operating for the protection and management of natural resources.

3. Attached as **Exhibit A** is a true and correct copy of a letter dated September 26, 2022, from Andrew Willis, with California Coastal Commission, addressed to myself and Jeff Rosaler, at the City of Dana Point.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on this 26th day of September 26, 2022, at Hercules, California.

DL Rogers

DEBORAH L. ROGERS

5199089.1

EXHIBIT A

CALIFORNIA COASTAL COMMISSION
South Coast Area Office
301 E. Ocean Blvd., Suite 3000
Long Beach, CA 90802-4302
(562) 590-5071

SENT VIA EMAIL

September 26, 2022

Jeff Rosaler
Community Development Manager
City of Dana Point
33282 Golden Lantern
Dana Point, CA 92629

Deborah Rogers
Co-Executive Director & Director of Conservation Science and Stewardship
Center for Natural Lands Management
27258 Via Industria, Suite B
Temecula, CA 92590

Re: Operation of bluff top trail at Dana Point Preserve

Dear Mr. Rosaler and Ms. Rogers:

Commission staff is following up on its letter dated November 4, 2021, in which we identified the coastal development permit process as the path forward for the Center for Natural Lands Management to set hours of operation for the bluff top trail at the Dana Point Preserve, to provide an alternative mechanism to set the hours of operation, also within the coastal development permit context. Namely, that mechanism is the condition compliance process for the Master Coastal Development Permit for The Strand development (CDP No. 04-23).

As noted in our November 4 letter, CDP No. 04-23 does not authorize specific hours of operation for the trail. However, Condition No. 38 of CDP No. 04-23 does require submittal of a habitat management plan ("HMP"), and preliminary drafts of the HMP did contemplate hours of operation for the trail. The HMP thus could be an alternative avenue for CNLM to set hours of operation, as approved by the City, wildlife agencies, and the Coastal Commission - Condition No. 38 requires, in part, that "[a] habitat management plan shall be prepared and submitted for review and approval by the Community Development Director, wildlife agencies and Executive Director of the Coastal Commission prior to disturbance of any ESHA." Although a draft HMP was prepared in 2005 and circulated for review, and Commission provided comments on the draft HMP, Commission staff is not aware of providing final approval of the HMP that established hours of operation for the preserve, but we would be happy to receive any information to the contrary.

We note that any hours set through the HMP must be found to be consistent with relevant conditions and policies of CDP No. 04-23 and the Headlands Development and Conservation Plan ("HDCP"), which is one component of the Local Coastal Program that governs development at the preserve. For instance, with regard to the latter, Table 4.5.1 of the HDCP states, in part:

> The bluff-top trail in the Headlands Conservation Park shall be accessible to the

> public year-round, except for any specific period determined by the resources agencies to protect on site resources. The recipient public agency or non-profit entity will determine hours of daily operation.

We encourage CNLM to consider submitting an HMP to the City, Commission, and wildlife agencies for review and approval. Through that process the proposed hours of operation can be analyzed for consistency with provisions of the HDCP that identify, in this location, the goal of balancing public access with protection of sensitive wildlife species at the preserve.

As suggested in our November 4 letter, Commission staff is happy to meet with the parties to find a mutually acceptable path forward to resolution of this matter through the coastal development permit process, including, potentially, through the condition compliance process for CDP No. 04-23. Please contact me to schedule a meeting to discuss how we can work together to resolve this matter.

Sincerely,

Andrew Willis
Enforcement Manager

cc: Lisa Haage, Chief of Enforcement, CCC
Karl Schwing, Deputy Director, CCC

<u>**PROOF OF SERVICE**</u>

***Center for Natural Lands Management v. City of Dana Point, and Cross Action*, Superior Court of Orange County Case No. 30-2021-01219668-CU-OR-CJC**

STATE OF CALIFORNIA, COUNTY OF ALAMEDA

At the time of service, I was over 18 years of age and not a party to this action. I am employed in the County of Alameda, State of California. My business address is 1999 Harrison Street, 9th Floor, Oakland, CA 94612.

On September 26, 2022, I served true copies of the following document(s) described as **DECLARATION OF DEBORAH L. ROGERS, PH.D., IN SUPPORT OF OBJECTIONS TO [PROPOSED] ORDER GRANTING PRELIMINARY INJUNCTION** on the interested parties in this action as follows:

Patrick Munoz, Esq. Jennifer Farrell, Esq. Robert Owen, Esq. RUTAN & TUCKER LLP 18575 Jamboree Road, 9th Floor Irvine, CA 92612	Attorneys for Defendant and Cross-Complainant CITY OF DANA POINT Telephone: (714) 641-5100 Facsimile: (714) 546-9035 Email: pmunoz@rutan.com jfarrell@rutan.com bowen@rutan.com

BY ELECTRONIC SERVICE: I electronically filed the document(s) with the Clerk of the Court by using the One Legal system. Participants in the case who are registered users will be served by the One Legal system. Participants in the case who are not registered users will be served by mail or by other means permitted by the court rules.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on September 26, 2022, at Oakland, California.

MBender

Melissa Bender

CALIFORNIA COASTAL COMMISSION
South Coast Area Office
301 E. Ocean Blvd., Suite 3000
Long Beach, CA 90802-4302
(562) 590-5071

SENT VIA EMAIL

September 26, 2022

Jeff Rosaler
Community Development Manager
City of Dana Point
33282 Golden Lantern
Dana Point, CA 92629

Deborah Rogers
Co-Executive Director & Director of Conservation Science and Stewardship
Center for Natural Lands Management
27258 Via Industria, Suite B
Temecula, CA 92590

Re: Operation of bluff top trail at Dana Point Preserve

Dear Mr. Rosaler and Ms. Rogers:

Commission staff is following up on its letter dated November 4, 2021, in which we identified the coastal development permit process as the path forward for the Center for Natural Lands Management to set hours of operation for the bluff top trail at the Dana Point Preserve, to provide an alternative mechanism to set the hours of operation, also within the coastal development permit context. Namely, that mechanism is the condition compliance process for the Master Coastal Development Permit for The Strand development (CDP No. 04-23).

As noted in our November 4 letter, CDP No. 04-23 does not authorize specific hours of operation for the trail. However, Condition No. 38 of CDP No. 04-23 does require submittal of a habitat management plan ("HMP"), and preliminary drafts of the HMP did contemplate hours of operation for the trail. The HMP thus could be an alternative avenue for CNLM to set hours of operation, as approved by the City, wildlife agencies, and the Coastal Commission - Condition No. 38 requires, in part, that "[a] habitat management plan shall be prepared and submitted for review and approval by the Community Development Director, wildlife agencies and Executive Director of the Coastal Commission prior to disturbance of any ESHA." Although a draft HMP was prepared in 2005 and circulated for review, and Commission provided comments on the draft HMP, Commission staff is not aware of providing final approval of the HMP that established hours of operation for the preserve, but we would be happy to receive any information to the contrary.

We note that any hours set through the HMP must be found to be consistent with relevant conditions and policies of CDP No. 04-23 and the Headlands Development and Conservation Plan ("HDCP"), which is one component of the Local Coastal Program that governs development at the preserve. For instance, with regard to the latter, Table 4.5.1 of the HDCP states, in part:

> The bluff-top trail in the Headlands Conservation Park shall be accessible to the

public year-round, except for any specific period determined by the resources agencies to protect on site resources. The recipient public agency or non-profit entity will determine hours of daily operation.

We encourage CNLM to consider submitting an HMP to the City, Commission, and wildlife agencies for review and approval. Through that process the proposed hours of operation can be analyzed for consistency with provisions of the HDCP that identify, in this location, the goal of balancing public access with protection of sensitive wildlife species at the preserve.

As suggested in our November 4 letter, Commission staff is happy to meet with the parties to find a mutually acceptable path forward to resolution of this matter through the coastal development permit process, including, potentially, through the condition compliance process for CDP No. 04-23. Please contact me to schedule a meeting to discuss how we can work together to resolve this matter.

Sincerely,

Andrew Willis
Enforcement Manager

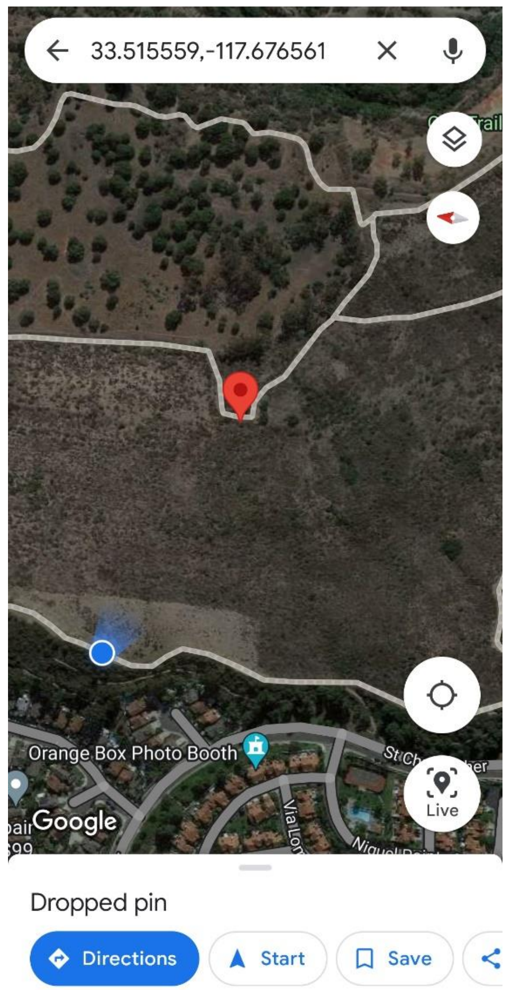
cc: Lisa Haage, Chief of Enforcement, CCC
Karl Schwing, Deputy Director, CCC

12/05/2022 (Matt Marowitz)

12/06/2022

S053 – Pacifica San Juan (on-site and off-site)

- CE compliance monitoring
    - Some mismatch with previous photos and photo pt locations at the off-site area
        - Pt 8 was off and corrected
        - Pts 3 and 4 previous photos taken above barbwire along trail but the photo pts are below the barbwire
    - Looks like there is a homeless encampment along the bottom trail that is outside of our preserve



12/07/2022

S033 – Dana Point

- Patrol
  - Signs of trespass over selva employee gate
  - Received .25 inches of rain

Office Tasks

- Weekly report
- Emailed homeless liaison
- Added to trespass log

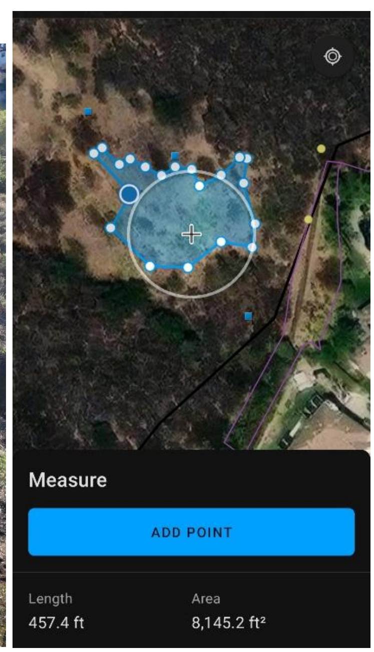
S033 – Dana Point

- Patrol
  - Trespass at OL3, 2 people taking photos @ 13:30
  - Trespass between OL3 and OL4, 1 person taking photos @ 16:10
  - **PPM seen at OL3 @ 16:35**
    - Mouse looked to be foraging in the OL3 area and was there from 16:35 till I left at 17:00

12/08/2022

S030 – Coyote Hills

- Seeded upper cactus canyon ridge
  - 7 gallons of seed spread



12/09/2022

S033 – Dana Point

- Patrol
  - Signs of trespass at OL3 and OL4

Office Tasks

- S030 CE document

S032 – Marblehead

- Worked on drilling handle hole for backpack sprayer

S033 – Dana Point

- Patrol
  - Sunset patrol
    - Found memorial flowers off of OL3

12/10/2022

S033 – Dana Point

- Collected sd cards for trespass and wildlife cameras

S032 - Marblehead

- Finished drilling hole into backpack sprayer for the handle
- Patrol
  - **Encampment adjacent to Pico Park is gone**

S033 – Dana Point

- Patrol, nothing to report


Turf Pro

Center for Natural Lands Management
A non-profit organization for the protection and management of natural resources

27258 Via Industria, Suite B
Temecula, CA 92590-3751
Phone: 760.731.7790
Fax: 760.731.7791
www.cnlm.org

March 14, 2023

<u>City of Dana Point</u>

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Bernice Villanueva	bvillanueva@danapoint.org

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VIA ELECTRONIC MAIL

RE: Draft Habitat Management Plan for Public Access at Dana Point Preserve

Dear Colleagues:

The Center for Natural Lands Management (CNLM) is submitting for your review and comment a draft habitat management plan (Plan) for public access for the Dana Point Preserve (Preserve), located in the City of Dana Point, in Orange County, California. As you know, CNLM, a nonprofit organization, owns the 29.4-acre Preserve and manages the habitat for protection of the unique coastal resources, including the endangered Pacific Pocket Mouse (PPM) and the threatened coastal California gnatcatcher. CNLM acquired the Preserve in 2005 and manages the Preserve under the Orange County Central Coastal Subregions Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP), Coastal Development Permit (CDP) 04-23, the Headlands Development and Conservation Plan (HDCP), and the Conservation

Easement (CE) granted by CNLM to the City of Dana Point, with U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW) as third-party beneficiaries, which all incorporate provisions of federal and state law governing both sensitive species and public access under the Coastal Act. This Plan is being submitted under CDP 04-23 Condition No. 38, which describes provisions for a habitat management plan as part of the coastal development permit process for the Headlands area in Dana Point.

The proposed Plan specifically addresses issues related to public access to the blufftop trail on the Preserve and impact to sensitive species and habitat. The Plan describes the history and changes in public use of the trail, data and research on species at the Preserve, especially PPM, and data and research related to recreational ecology and impacts of passive recreational use on natural resources. Finally, the Plan proposes hours of public use of the trail that are consistent with the Coastal Act, the HDCP, and the City of Dana Point's Local Coastal Program.

CDP Condition No. 38 requires the approval of a habitat management plan by the City of Dana Point Community Development Director, the Executive Director of the California Coastal Commission, and by USFWS and CDFW. As such, CNLM is submitting this draft to representatives of these agencies and requesting your input. We would appreciate receiving any comments within 45 days of the date of this letter.

Sincerely,

DL Rogers

Deborah L. Rogers, Ph.D.
Co-Executive Director &
Director of Conservation Science and Stewardship
Center for Natural Lands Management

Attachment: Draft 2023 Habitat Management Plan for Public Access for the Dana Point Preserve

cc (Via Electronic Mail):

Sarah Mueller
General Counsel
Center for Natural Lands Management
smueller@cnlm.org

Korie Merrill
Regional Preserve Manager – South Coast
Center for Natural Lands Management
kmerril@cnlm.org

2023 Habitat Management Plan for Public Access for the Dana Point Preserve

Prepared by: Korie C. Merrill, M.S.
Preserve Manager

Michelle A. Labbé, M.S.
Conservation Analyst

Deborah L. Rogers, Ph.D.
Co-Executive Director &
Director of Conservation Science and Stewardship

Center for Natural Lands Management

Center for Natural Lands Management
www.cnlm.org

DRAFT March 14, 2023

2023 Habitat Management Plan for Public Access for the Dana Point Preserve

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1. Preface

The Center for Natural Lands Management (CNLM) owns and manages the 29.4-acre Dana Point Preserve (Preserve), located in the City of Dana Point, Orange County, California. CNLM has prepared this habitat management plan (2023 Plan or Plan) for public access for the Preserve pursuant to Master CDP 04-23 for the City of Dana Point, specifically Condition No. 38.

CNLM submits the 2023 Plan focused on public access control at this time because of changing needs based on adaptive management, recent events regarding the management of public access for public health reasons, and the increased sensitivity of the natural resources on the Preserve. CNLM is in the process of preparing a comprehensive habitat management plan governing all aspects of the adaptive decision-making process for the management of the Preserve and long-term vision, continuity, and consistency for habitat management of the Preserve; the 2023 Plan will be incorporated as a component of that upcoming comprehensive habitat management plan.

CNLM acquired the Preserve in 2005 for the purpose of protecting the rare coastal sage scrub community and habitat for the threatened coastal California gnatcatcher (*Polioptila californica californica* or gnatcatcher) and endangered Pacific pocket mouse (*Perognathus longimembris pacificus* or PPM). CNLM's management of the Preserve is overseen by the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW) through, in part, the Orange County Central and Coastal Subregions Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP)[1]. The NCCP/HCP originally called for a temporary preserve for PPM on a portion of what is now the Preserve property; USFWS and CDFW approved the permanent protection of the Preserve through ownership and adaptive management by

[1] The previous owner of the Preserve property was a "Participating Landowner" under the NCCP/HCP, which commits the landowners to address impacts to and conservation of PPM, gnatcatcher, and other species on certain property, including the Preserve. The City of Dana Point is also a Participating Landowner.

CNLM, as part of the development of the Headlands area of Dana Point, as described below.

In 2004, the City adopted the Headlands Development and Conservation Plan (HDCP), which implements the Coastal Act for the Headlands area. The HDCP called for the creation of a conservation area to protect environmentally sensitive habitat areas (ESHA) within the project site, and specifically to balance protection of natural resources with public access on the Preserve. HDCP Policy 5.20 calls for "[r]egulat[ing] the time, manner and location of public access to parks and open space containing sensitive biological resources to maintain and protect those sensitive resources and to protect the privacy rights of property owners while honoring the public's constitutional right of access to navigable waters." Policy 3.7 provides that ESHA "shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas. . . .". The HDCP called for limited portions of the Preserve to "accommodate passive uses, such as the bluff top trails, security fencing, overlooks, seating and signage. . . ." (HDCP, Table 3.4.5).

The HDCP provides for establishment of the Preserve and designates it for Conservation Open Space, "the most restrictive land use within the [Headlands] project". Further, the HDCP requires long-term preservation and management of habitat for sensitive species, including the Pacific pocket mouse, provides for a non-profit trust to manage the Preserve in conjunction with USFWS and CDFW, and calls for recording a conservation easement to ensure the Preserve remains permanently conserved open space. Noting that the Preserve will "include[s] a limited bluff top trail . . . and limited visitor access to the coastline and natural environment," the HDCP provides that "[b]alancing the desire for limited public access and views along the perimeter, the [Preserve] is designed to protect a number of sensitive flora and fauna, including the Pacific pocket mouse" and "[a]s a result, and to protect this natural resource from overuse, only limited portions of the area will accommodate passive uses" and the "non-profit entity will establish hours of operation for the bluff top trail" (HDCP, Table 3.4.5).

Owing to its experience and expertise managing habitat for endangered species, CNLM was selected to be that non-profit entity.

The City authorized development of the Headlands Project, including the Preserve, under the California Coastal Act by issuing Coastal Development Permit 04-23 (Permit or CDP) on January 19, 2005 (City of Dana Point 2005). The CDP specifies that a "pedestrian trail of decomposed granite/gravel shall provide controlled access to the coastal bluff top" and requires all development to "be consistent with and comply with all requirements of the HDCP." It also calls for preparation of a habitat management plan before disturbance of any environmentally sensitive habitat area (ESHA)[2] and protection of Preserve ESHA by dedication of a conservation easement to the City or other appropriate entity.

On December 20, 2005, CNLM, the owner of the Preserve, granted a Conservation Easement (CE) over the Preserve to the City, which the City accepted as compliance with the CDP condition calling for a conservation easement (CNLM and City 2005). The purpose of the CE is "to ensure that biological values and resources in the [Preserve] continue to exist in perpetuity, and to prevent any use of the [Preserve] that will materially impair or interfere with such values and resources." The CE prohibits "[u]ncontrolled public access" and public access during non-daylight hours (with limited exceptions), and permits controlled public access to the nature trail and overlook areas for passive recreational uses.

A draft habitat monitoring and management plan for the Preserve and adjacent land now owned by the City of Dana Point was prepared by a consultant for Headlands Reserve, LLC in 2005, but appears to have never been finalized or approved by the City, the Coastal Commission, USFWS, or CDFW. Nevertheless, CNLM has submitted annual reports and work plans for management of the Preserve to the wildlife agencies

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[2] HDCP Policy 3.1 describes the importance of areas designated as ESHA as "areas where plant or animal life of their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could easily be disturbed or degraded by human activities. . . ."

and the City since CNLM acquired the Preserve in 2005, which include comprehensive management and monitoring reporting and planning related to the Preserve. As mentioned above, CNLM is currently working on a comprehensive adaptive management plan for the Preserve, and this Plan covers adaptive management related specifically to public access to the blufftop trail on the Preserve.

The Preserve is small (relative to its intended conservation purpose), has distinct and hard edges on most boundaries (being bounded by the Pacific Ocean on its western boundary and by hardscaped City streets and residential development on most of the rest of its perimeter; Figure 1), and is occupied by two listed species within a fragile and rare suite of landscape features. In accordance with the CDP and HDCP, a trail was designed and created on the Preserve, and initially opened for public access in December 2009.

The Preserve is protected with a wildlife-friendly, six-foot-high iron fence (Figure 2) or concrete wall on all sides except the coastal bluff-tops and the border with Hilltop Park. CNLM's public access trail can be accessed by the visiting public from two locations with clearly marked gates—Scenic and Dana Strand (Figures 2 and 3). The trail is approximately 0.5 miles in length and includes five overlook areas (with benches and/or educational signs). Both the trail and overlook areas are well defined and enclosed by a post-and-cable trail fence. Any off-trail use would require intentionally climbing through or over the fence. Further, the trail meanders through the Preserve exposing the majority of the Preserve to potential public use impacts (i.e., within 100 meters of the trail). Gates are closed at all times except when individuals are entering and exiting the Preserve and are controlled by automatic devices powered by solar panels. The gates are locked when the trail is not open for public access. Signs and interpretive panels provide information about the Preserve, including allowable (e.g., hiking, running, and wildlife viewing) and prohibited (e.g., collecting materials, smoking, off-trail use, drone use, pets, bicycles, etc.) activities for trail use (Figures 2 and 3). Informational kiosks are also located at each gate with maps showing the trail and the list of trail use rules. The public also has access to informational brochures (available in the Nature

Interpretive Center), created by CNLM and the City, that provide allowed and prohibited activities on the trail, a map of the trail, information on the common plant and bird species seen from the trail, and a list of alternative nearby areas where dogs are allowed on trails.

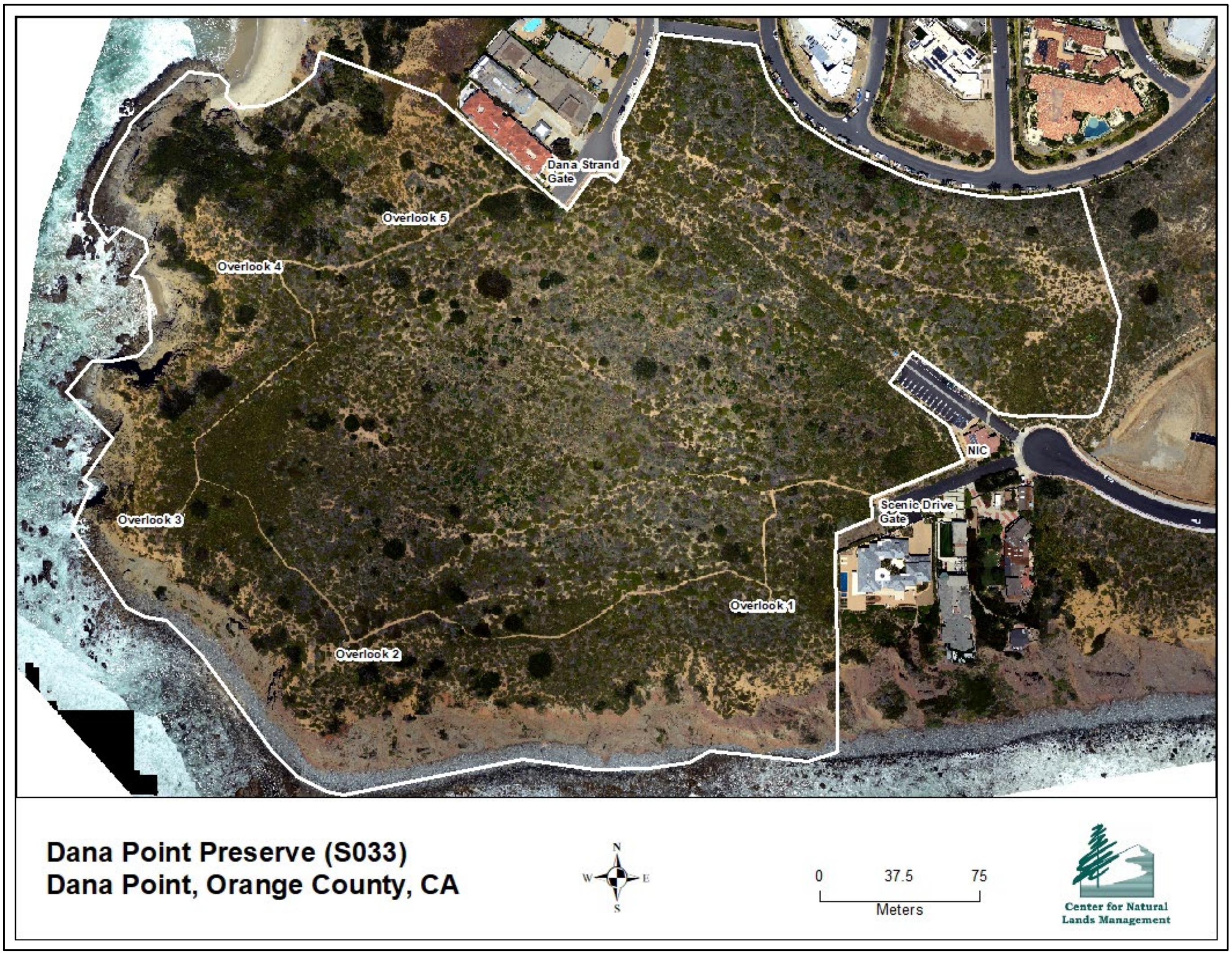

Figure 1. Overview of the CNLM Dana Point Preserve with boundary, trail, and gate features. The trail is the muted line within the Preserve area (bounded by a white line) and shows the overlook areas.

Since the trail was opened to the public in December 2009, it was generally open seven days per week, from approximately 7:00 a.m. to sunset. CNLM staff further controlled access to the trail by closing the trail, in part or in its entirety, from time to time for, among other reasons, protection of nesting locations of gnatcatchers near the trail (where trail use would risk nest abandonment and the death of nestlings), repair of the trail where storm events have made it unserviceable and/or unsafe, repair and maintenance of fences and other infrastructure, or other preserve management activities that would have been significantly affected by public presence or that may present a public safety risk.

CNLM is required to practice adaptive management with respect to the Preserve, which aims to improve management practices incrementally by designing, adjusting, and implementing plans in ways that facilitate learning from experience. Thus, when the Preserve was created and the trail was established, it was anticipated that changes in public access, among other things, could occur due to adaptive management. The U.S. Department of the Interior describes adaptive management as a decision process that:

> promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a "trial and error" process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders (Williams et al. 2009, National Research Council 2004).

CNLM stewardship practices reflect the principles and include the core elements of adaptive management (Rogers 2007). With this Plan, CNLM endeavors to make use of what it has learned since creation of the Preserve in 2005 and opening of the trail in 2009. As described in detail in the Plan, the intensity of public use of the Preserve has increased greatly since the trail was opened, and the Pacific pocket mouse has become more vulnerable to extinction. In addition, in the last 18 years, we have gained a much better understanding of the impacts of passive recreation on natural resources. As a result of these developments, CNLM is proposing hours of operation for public access to the Preserve trail that are more likely to be protective of the resident species.

2. Executive summary

The approximately 29-acre Dana Point Preserve (Preserve), located within the City of Dana Point in Orange County, California, has been owned and managed by the Center for Natural Lands Management (CNLM) since December 2005. The Preserve, in addition to supporting a rare coastal sage scrub community with considerable biodiversity, provides habitat for (and extant occurrences of) two listed species—the (federal) threatened coastal California gnatcatcher (*Polioptila californica californica*) and the (federal) endangered Pacific pocket mouse (*Perognathus longimembris pacificus*). A management plan for the Preserve was drafted in 2005 but provided little information regarding public access, although noting that excessive or uncontrolled access could result in habitat degradation. A conservation easement, granted to the City by CNLM in 2005, is intended to ensure that biological values and resources in the Preserve continue to exist in perpetuity, and to prevent any use that would materially impair or interfere with such values and resources. For much of the period between 2009—when the trail on the Preserve was first opened to the public—until the COVID-related substantial closure in 2020, the trail was open to the public generally seven days per week, typically 7:00 a.m. to sunset. CNLM staff closed the trail or modified public access as needed for trail maintenance, in particular, and for other reasons including protection of sensitive nesting locations. However, when the trail opened to public access in 2009, there was no underlying research or principles that supported this amount of public access in relation to the need to protect the sensitive onsite natural resources. This 2023 Plan provides evidence-based information pertaining to public use of the Preserve trail, relevant scientific literature, and a proposed schedule and rationale for public access. Although the Preserve contains a multitude of sensitive and rare species, the species of most management concern is the highly endangered Pacific pocket mouse (PPM) because there are only three populations left in the wild and the Dana Point population is highly important to the persistence of the species.

Hundreds of scientific studies—encompassing both individual research studies and literature syntheses—were reviewed in preparation for this 2023 Plan. The majority of studies concluded that public presence (“passive recreation”) in parks and preserves had negative impacts on wildlife. The sights, sounds, vibrations, movements, and smells of the public can elicit avoidance or stress responses. Other behaviors—bringing dogs on preserves, littering, walking off trail—further compounded the harmful impacts. Studies based on COVID-related park/preserve closures further confirmed that wildlife responded favorably in the absence of the visiting public. When neutral or positive impacts of the visiting public were noted, these were largely the result of financial support from the visiting public or benefits to generalist species (e.g., raccoons, foxes, coyotes) that adjusted to human presence and foraged on trash left behind.

Public visitation data collected on the Preserve shows dramatic increases in the number of visitors since 2011 when monitoring commenced. The number of visitors doubled between 2011 and 2017—from an average of 345 per day to 673 per day (approximately 250,000 visitors per year). In February 2023, the average daily visitation was 800 (~300,000 visitors per year).

Directly studying effects from the visiting public on PPM or other resources is difficult. The most likely effect is stress (with downstream impacts on reproduction, survival, and population persistence) but this is difficult to measure without causing impacts to the species. Data based on live-trapping events indicate that PPM decreased after the trail initially opened in 2009 and increased after the trail was closed to the public in 2020. However, there are many other variables that can affect PPM, including climate change and vegetation condition, and separating all the effects is difficult if not impossible. Some of those variables are more controllable than others and are additive in their impacts. PPM as a species has become more vulnerable over recent decades due to the loss of one of the previously four extant populations. Additional threats to PPM or other species on the Preserve that are more recent include two deadly viruses (affecting snakes and rabbits), Argentine ants, and the unpredictable and multiple impacts of climate change.

The preponderance of scientific literature pointing to the general negative impacts on wildlife from the visiting public, the increasing number of visitors to the Preserve, the incidents of trespass in the Preserve, and the other (largely uncontrollable) threats to PPM and other species, indicate a greater need to control public access. Without appropriate control, further impacts on PPM and other species seem likely and, at some point, would become irreversible, leading to extirpation. CNLM proposes a public access schedule of four days per week (including weekends, given their popularity with the public) with a summer (10 hours per day) and winter (8 hours per day) schedule. CNLM also proposes to set aside certain times for educational group visits on the trail—to facilitate public education, nature appreciation, and opportunities to engage disadvantaged and underserved communities. This schedule reflects the need to avoid public access during low-light times of the day when PPM is more likely to be active above-ground and engaging in critical activities including feeding, “bathing”, and reproductive behavior. A schedule of four days per week should also serve to provide better control on overall visitation (and related impacts) and address the trends of ever-increasing numbers of visitors. Although the Preserve is a critical home environment for the resident species, particularly PPM, alternatives for public recreation, aesthetic enjoyment, and nature appreciation abound both within the City of Dana Point and Orange County more generally. Within the City limits alone, there are 28 parks (15 with coastal views) and 11 miles of trails. The Dana Point Preserve trail has no access to water or beaches. The proposed schedule of public access to the trail and associated adaptive management activities are consistent with the Coastal Act, the HDCP, the CDP, and the Conservation Easement.

The proposal for public access to the trail on the Dana Point Preserve is accompanied by continuing and additional monitoring of both public visitation and the natural resources to further the goals of adaptive management. The Preserve’s natural resources will continue to be managed as well to lessen threats and impacts as much as possible. Information will continue to be sought from the visiting public, relevant scientific literature, onsite data and experience, and guidance from the research and regulatory communities. The practice of adaptive management will continue to be implemented to best effect to protect the natural resources and provide controlled public access, revisiting access schedules from time to time as appropriate.

Figure 2. Exterior sign on the Dana Point Preserve's Dana Strand Gate referring to prohibited uses. Some information is also provided on one of the two listed species on the Preserve—coastal California gnatcatcher. The type of fence that surrounds the Preserve can also be seen.

Figure 3. Exterior sign on the Dana Point Preserve's Scenic Gate referring to prohibited uses. Some information is also provided on one of the two listed species on the Preserve—the Pacific pocket mouse.

3. Sources of information regarding public access

Since 2005, when the Preserve was acquired, there has been considerable accumulation of information and experience that is relevant to this 2023 Plan, including:

- CNLM management experience on the Preserve relative to public access
- Changes in use of the Preserve by the public over time
- Changes in vulnerability of PPM at the species and population levels
- Information on PPM and gnatcatcher presence over time

- Changes in threats to the natural resources onsite
- A growing base of scientific literature regarding the relationship(s) between public use ("passive recreation") of nature preserves and wildlife response

Each of these topics has been explored and is described below.

3.1. CNLM management experience on the preserve relative to public access

During CNLM's more than 17 years of experience in managing the natural resources onsite and more than 13 years of experience in controlling public access of the Preserve, considerable insight has been gained into the relationship between these activities. Management activities related specifically to public access include monitoring, prevention of trespass and other prohibited behaviors, and remediation of some of the damage caused by trespass. The primary prohibited activities on the Preserve are using the trail outside of allowed hours, trespassing off the trail, littering, smoking, bringing pets onto the trail, and removing vegetation.

Monitoring of public access has included the use of trail counters to obtain information on the number and timing of visitors (see Section 3.2, below), as well as monitoring by CNLM staff on site. Since the trail opened to the public in 2009, CNLM has continued to hire additional staff to provide an onsite presence. CNLM currently has four staff members on site for an average of six days per week. CNLM staff at the Preserve patrol the trail, provide information and education to interested visitors, ensure that fencing, gates, and signage are intact, and interact with visitors who trespass off the trail or otherwise engage in prohibited activities. CNLM staff also document incidents of trespass and other prohibited behaviors. CNLM staff further plant vegetation or piles vegetation in areas that experience high frequencies of off-trail use (i.e., trespass) by the public to create additional barriers along the trail fence, and coordinate with CDFW Game Wardens and Orange County Sheriff's Department to help patrol and issue citations.

The most prevalent type of observed prohibited behavior (noted as an “incident”) documented on the Preserve is trespass by visitors off the trail. From June 2017 to February 2023, 374 incidents were documented, 59% (220) of those were off-trail incidents (Figure 4). Despite numerous signs, fencing, and the presence of CNLM staff, visitors continue to climb over the fence and go off the trail. The second most common incident at 22% (81) is pet dogs and cats on the trail. These incidents do not include incidents where staff intervened and prevented pets from entering the trail, only those observed on the trail. On average, these instances occurred approximately 15% of the days staff were on site. As an incident can only be recorded when staff is onsite to observe it, this is likely an underestimate as it does not include events that occurred when staff weren’t present. In the first two months of 2023, the number of dogs on the trail had already reached 10 incidents, which is double the observed number of incidents in 2020 and 2021 combined (K. Merrill pers. comm.).

Trespass on the trail after the trail is closed is also frequently observed. In 2022, wildlife cameras were installed at both the Selva and Scenic gates and have become useful tools in documenting trespass after hours and after sunset, in particular. In September and October 2022, when the trail access schedule was eight hours per day for three days per week, the average number of monthly trespass incidents after sunset was 2 (±1.1) and 1.6 (±0.5) per month, respectively. When the trail schedule was changed to open seven days per week, 7:00 a.m. to sunset, the average monthly trespass after sunset was 2.75 (±0.6) in November and 5 (±1.1) in December 2022 (Figure 5).

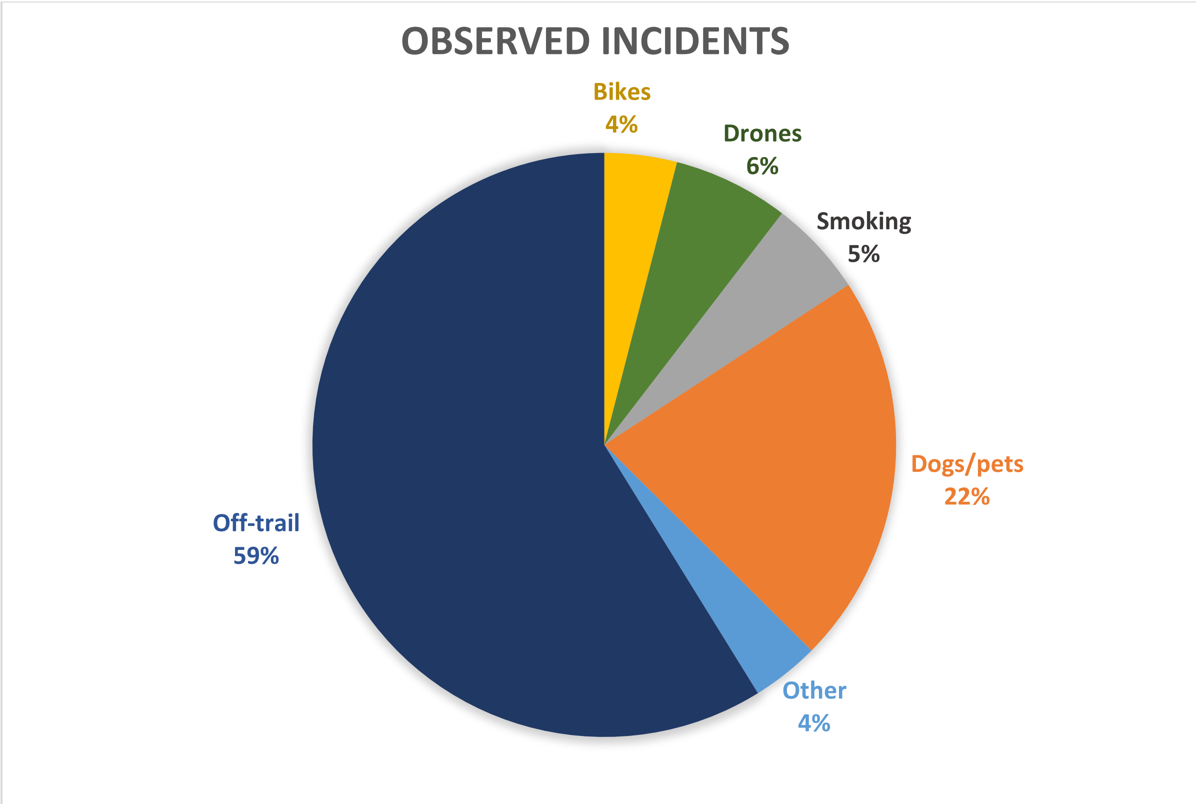

Figure 4. Observed incidents 2017-2023. Incidents observed only include active behaviors (these do not include evidence of trespass such as littering or footprints) observed by CNLM staff. Other includes spreading human remains, harassing wildlife, drinking alcohol, excavation, urination, and littering. Bikes include bicycles, e-bikes, and unicycles. Smoking incidents only include active smoking (does not include evidence of smoking such as cigarette butts). Drones only include drones flown from and over the Preserve (drones flown over the Preserve from the adjacent beach aren't included). Off-trail indicates people stepping off the trail. Dogs/pets only includes those observed on the trail.

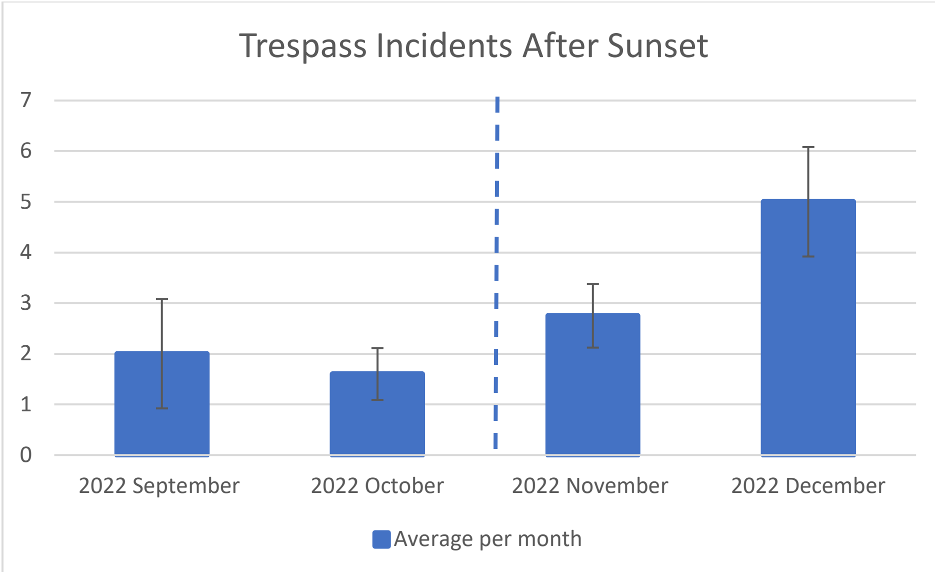

Figure 5. Trespass incidents after sunset. Average number of incidents caught on wildlife cameras at the Scenic and Selva gates for four months (mean, standard error). During September and October 2022 (to the left of the dashed line) the trail schedule was three days a week 8:00 a.m. to 4:00 p.m. and for November and December (right of the dashed line) the trail schedule was 7:00 a.m. to sunset, seven days per week.

Regardless of high levels of staff and volunteer effort, violation of trail rules by the visiting public is not decreasing. For the period November 5, 2022 to February 26, 2023, with a public access schedule of open daily from 7:00 a.m. to sunset, CNLM staff conducted patrols for 49 days and reported 38 incidents with a total of 165 visitors that refused to leave the trail at sunset. These incidents are in addition to those reported above in Figure 5. CNLM staff have called the Orange County Sheriff's Department's non-emergency phone line for a few of these incidents and, on one occasion, the Orange County Fire Authority responded. However, as far as reported by CNLM staff, no citations were given to individuals who trespassed after sunset (K. Merrill pers. comm.).

Other examples of destructive behavior by the public not abiding by trail rules include leaving food or trash onsite (may attract predators), bringing pets (usually dogs) onto the Preserve (sights and smells from domestic animals can have serious impacts on resident wildlife), making collections of plant materials for personal or commercial landscaping purposes (thereby potentially reducing the viability, amount, or reproductive potential of those plant species), and engaging in other activities that can threaten the Preserve or its component biota including geocaching, smoking, playing recorded bird calls/songs, conducting wedding ceremonies, establishing memorials, scattering human cremains, catching insects, and using drones. Even public use of the adjacent parking lot has the potential to cause impacts: in 2010 and 2017, vehicles were driven through the perimeter fence into the Preserve (CNLM 2011, 2018). All these behaviors have been observed by CNLM staff on the Preserve and documented in annual reports since 2010 (CNLM 2011-2021). CNLM staff frequently update signage and trail rules in response to new types of incidents. For example, in 2022 unicycle use was added to the list of prohibited activities because some visitors argued it wasn't a bicycle and therefore was allowed on the trail (K. Merrill pers. comm.).

Regardless of the effort and efficacy in detecting and stopping trail use violations, ultimately it is not feasible to detect and stop all such incidents. Most significantly, harm to the species may already have occurred by the time the activity is detected.

CNLM staff respond to the most immediate and visible signs of impact to the Preserve from off-trail trespass by removing debris and litter, restoring trampled or cleared vegetation, and monitoring for crushed or otherwise impacted gnatcatcher nests and PPM burrows. However, trespass can cause other less observable and difficult to redress cumulative impacts on the species and habitat, such as behavioral changes, including alteration of perceived threats or predator avoidance, especially during low light hours and after sunset.

Public access by visitors who observe trail rules also affects the species, through the sights, sounds, smells, movements, and vibrations of public presence, as discussed below in Section 3.4. Additionally, as further described in Section 3.5, introduction of serious viruses or other pathogens that could be harmful or catastrophic for resident species can often be vectored on footwear and clothing of the visiting public. Efforts to control those threats with trail entrance disinfecting stations are difficult to enforce as the public typically disregard informational signage at the trail entrances and thus probably have little effect, as experienced with such efforts to control the spread of the rabbit hemorrhagic disease virus serotype 2 (RHDV2) (K. Merrill pers. comm.).

3.2. Changes in use of the preserve by the public over time

Since 2011, when public trail use was first monitored, public visitation has steadily increased and, in fact doubled over just a seven-year period. There are no data for trail use for the first year the trail was open to public access. However, in 2011, because of growing scientific evidence, concern over impacts from public access, and apparent increases in public use of the Preserve trail in the past year, CNLM commenced monitoring public visitation. With financial support provided by USFWS, staff installed infrared trail counters at both gated entrances (Dana Strand and Scenic) to the Preserve's trail to collect objective and quantitative data on the amount of public visitation of the Preserve trail over time. For analysis, these data were inspected for any issues that may have resulted from power failures or failures in triggering counts upon entry of the public. For an initial analysis in 2020, all days with reliable data counts were included in the dataset for the year and the average number of visitors per day (i.e., per day of data collection) was calculated. During 2011-2017, there was a high degree of useable data. Data collection during 2018-2019 was affected by a high incidence of no data collected or trigger failures due to dead batteries, corrosion of the electronic plates, and frayed wires. Thus, the 2018-2019 data were very incomplete and considered unreliable as estimates of public use of the trail. Accordingly, a seven-year presentation of visitation is provided for the period 2011 through 2017 (Table 1, Figure 6) and 2020-2023 (Table 2). To be clear, references in this document to "number of visitors" that were recorded on the Preserve is more accurately defined as "number of counts by the infrared trail counters".

There is a significant upward trend over time in average daily visitation, almost doubling in that seven-year (2011-2017) period from 345 per day to 673. If these averages are represented as estimates of annual number of visitors (multiplying by 365 as the trail was open most days of the year for that period), that would indicate an increase in visitors from over 125,000 in 2011 to over 245,000 in 2017.

Table 1. Average daily trail use counts at the Dana Point Preserve, 2011-2017.

Year	Average Daily Visitation[1]					Annual Visitation Estimate[2]
	Mean	**SE**	**N**	**Lower 95%CI**	**Upper 95%CI**	
2011	344.5	10.3	185	324.3	364.7	125,740
2012	319.6	9.8	248	300.4	338.7	116,637
2013	361.1	8.5	344	344.3	377.8	131,793
2014	355.8	9.2	306	337.8	373.8	129,851
2015	444.6	16.0	239	413.3	475.9	162,281
2016	612.7	19.3	366	575.0	650.5	223,643
2017	672.5	20.4	302	632.6	712.4	245,465

[1] Average daily trail use counts, which represents average daily visitation and 95% confidence intervals (CI), were calculated as the total counts of reliable data / days of reliable data collection per year. For this representation, data from one gate only (Scenic gate) were used. Although this could lead to an over-representation of visitors (i.e., those who both entered and exited from the Scenic gate), that bias is reasonably assumed to be counter-balanced by the opposite—i.e., visitors exiting and entering from the other gate only. Further, the number of visitors recorded is probably an underestimate of the actual number because the counter counts people passing the sensor with a delay of 1.5 seconds rather than counting all individuals, and visitors not infrequently enter the gate in a group—and thus would be counted as only one visitor.

[2] Estimates of annual visitation were calculated as average daily trail use counts * 365 days although there were some days that the trail would have been closed to the public for trail maintenance, etc.

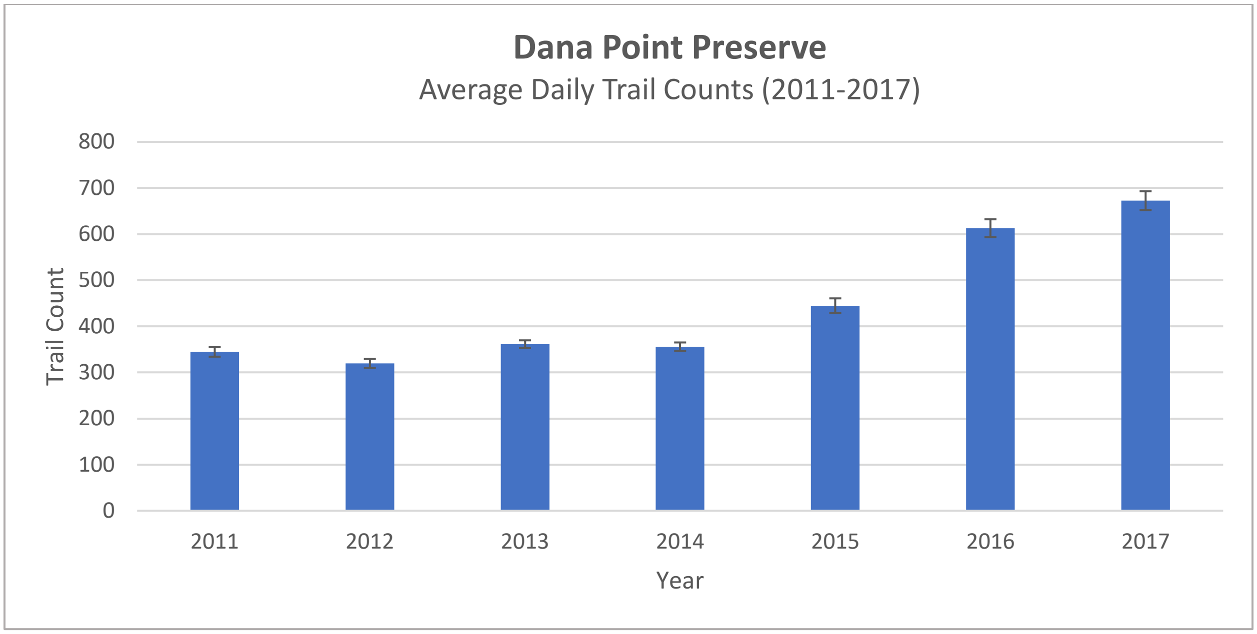

Figure 6. Average (mean, standard error) daily trail use counts (2011-2017) at the Dana Point Preserve.

Commencing in March 2020 to present, the public trail hours for the Preserve underwent intermittent changes, initially due to COVID-19 precautionary measures. As such, the data presented for this time period (2020-2023) have been characterized by schedule types as follows.

January 2020 – March 2020, Pre-COVID public trail use: In early 2020, the trail continued to be open for public use, for the most part, from 7:00 a.m. to sunset, seven days per week until mid-March 2020. Visitation data was collected for these three months.

March 2020 – June 2021 public trail use: The trail was closed in mid-March 2020 to the public—initially for trail maintenance and then longer because of public health directives regarding COVID-19. Although the narrowness of the trail could not accommodate the "social distancing" public directive in effect, the trail was re-opened gradually commencing in mid-October 2020 with a carefully implemented one-way access plan—initially for two days per week, three hours per day. Public compliance with COVID-19 safety rules for the trial was monitored, as were COVID-19 statistics and public health directives, and, in response, the trail was temporarily closed mid-December 2020 to February 2021. By April 2021, the trail was opened for three days per week for four hours per day, and by mid-June 2021 it was open eight hours per day on those days. Given the multiple changes in the public access schedule, the data for the period of March 2020 to June 2021 are not presented.

<u>June 2021 – November 3, 2022 public trail use:</u> During this period, and with exceptions for trail closures related to weather and trail maintenance, etc., the trail was open to the public for three days per week (Tuesday, Thursday, and Saturday) for eight hours per day on those days (8:00 a.m. to 4:00 p.m.). During that approximately 16-month period, data were collected for 15 months (August 2021-November 2022).

<u>November 4, 2022 – February 27, 2023 public trail use:</u> Due to a preliminary injunction sought by the City of Dana Point and approved by the Orange County Superior Court, CNLM was required to open the trail for public access for 7:00 a.m. to sunset, seven days per week, commencing November 4, 2022 to present. During that 4-month period, trail counter data were collected for 3 months.

Public visitation rates as represented by trail counter data for the times periods described above are presented in Table 2.

Table 2. Average daily trail use counts at the Dana Point Preserve 2020-2023.

Period	Average daily visitation			Annual visitation estimate[4]	
	Access schedule	No. of months[3]	Mean	3 days/week schedule	7 days/week schedule
Jan – Mar 2020 (Pre-COVID)	7 days/week 7:00 a.m. to Sunset	3	713	-	260,245
[1]Aug 2021 – Nov 2022	3 days/week 8:00 a.m. to 4:00 p.m.	15	481	75,036	175,565
[2]Nov 2022 – Feb 2023	7 days/week 7:00 a.m. to Sunset	3	640	-	233,600

[1]The period March 2020 – June 2021 was not included due to the initial closure for seven months, followed by fluctuating public access hours. No trail counter data are available for June or July 2021.
[2] No trail counter data is available for December 2022.
[3] Number of months included in calculation (based on available data within period).
[4] Annual estimate based on access type, daily or three days per week (mean daily visitation * 3 [days] * 52 [weeks] or mean daily visitation * 365 [days]).

Data for January, February, and March 2020 (the period immediately preceding closure related to COVID-19) showed an average of 713±62.0 (SE) visitors per day. This suggests that the upward trend represented during 2011-2017 had continued, with an ever-increasing daily average of visitors on the public trail and had potentially reached over 260,000 visitors per year by March 2020. When the trail was open three days per week for 8 hours a day, the number of visitors per day was, on average, 481.1±18.1 (SE) somewhat higher than the average across 2011-2017 (444 per day), but much reduced from that in 2016 (613 per day), 2017 (673 per day), and the early 2020 observations of 713 per day. Extrapolating to annual visitation, based on three days per week, the estimate is 75,036. Further, if the eight hours per day visitation data are projected to a seven-day-per-week, 365-day schedule, annual visitation is estimated to be over 175,000, considerably higher than in 2011 (125,740).

In November 2022, when the trail was required to be open to the public seven days per week, 7:00 a.m. to sunset, visitation rates started to climb. Based on the three months of data available for this recent period, daily visitation rates had already increased by over 150 visitors per day, on average a 33% increase, with a projection of over 230,000 visitors per year. That number, however, is expected to be significantly exceeded, if that schedule remains in effect through 2023. Data shows that visitation at the beginning of that period was initially lower than expected for November and January, as the public was still accustomed to the previous schedule. The daily average for public visitation for February 2023, for the 20 days of data available, was 799.9 ±98.4 (SE)—an increase of approximately 12% over the pre-COVID 2020 daily average (713 per day).

The highest, and not just average, number of visitors per day could also be an important measure of impact on natural resources. At the very least, high daily visitor rates contribute disproportionately to annual visitor usage. Peak (one day) visitation can also be determined, although data are not available for every day that the Preserve's trail was open so the peak days for visitation (e.g., annually) cannot be confidently stated. Further, as previously explained, because several people can enter a gate at one time and only be counted as one, and if there are many visitors in a short period of time this is more likely to happen, that suggests that on busy days, the counts are likely to be underestimates of actual visitors. The greatest number of counts recorded on a single day within the period 2011-2017 was 2,896 and occurred on December 26, 2016. The highest daily count for early 2020 (January – March 2020) was 2,175 (February 16, 2020). Peak visitation days may be related to certain holidays and weather, thus there is no direct comparison available between 2016 and 2020 due to Covid-related closures on comparable dates/holidays. The highest daily count for the period August 2021 through November 2022, was 1,537 (January 1, 2022).

3.3. Information on Pacific pocket mouse and gnatcatcher presence over time

The two listed species on the Preserve have been monitored to provide information on their presence and changes in presence over time. For the coastal California gnatcatcher, surveys have been conducted annually by CNLM staff following USFWS protocols and permitted by CNLM's 10(a)(1)(A) permits. In addition to indicating presence, the surveys were generally able to detect numbers of individuals and reproductive groupings (pairs). Baseline data for the Preserve's population of gnatcatchers, collected in 2006, suggested a modest presence of perhaps three pairs or family groups (Table 3). Between 2006 and 2018, that number fluctuated between three and seven pairs—such fluctuations not being surprising for this (sub)species and variations in habitat conditions. There was an increase in 2019 to 14 pairs detected, and an even stronger increase in 2020 of 20 pairs. The results for the 2021 and 2022 monitoring events show a slight decline with 17 and 12 pairs detected, respectively (Table 3).

Table 3. Monitoring results for coastal California gnatcatcher on the preserve 2006-2022.

Reporting Year	Survey Results
2006	3 family groups
2007	3 pairs; 1 nest produced 3 fledglings
2008	4 pairs; all pairs produced 3-4 fledglings each
2009	5 pairs; all pairs produced 3-4 fledglings each
2010	4 pairs; all pairs produced at least 1 fledgling each
2011	5 pairs; 4 pairs produced at least 1 fledgling each
2012	7 pairs; all pairs produced at least 1 fledgling each
2013	7 pairs; 6 pairs produced at least 2 fledglings each
2014	6 pair; 3 pairs produced at least 1 fledgling each
2015	5 pairs; 3 pairs produced at least 1 fledgling each
2016	6 pairs (minimum)
2017	5 pairs (minimum)
2018[1]	7 pairs (minimum), one nest likely failed due to proximity to trail
2019	14 pairs; at least 8 pairs successful; multiple pairs attempted second nest.
2020	20 pairs; at least 9 pairs successful; multiple pairs attempted second nest
2021	17 pairs; at least 4 pairs successful; multiple pairs attempted second nest.
2022	12 pairs; at least 2 pairs successful; multiple pairs attempted second nest

[1]In 2018, one gnatcatcher nest was observed in a shrub immediately adjacent to the trail at Overlook 4. As a precaution to protect the nest, that small section of the trail was temporarily closed to public use (signs and temporary barriers were placed on both ends of the trail). However, visitors frequently ignored this closure and used that section of trail. Ultimately, that particular nest failed, and that pair did not produce a successful nest in 2018 (CNLM 2019).

For Pacific pocket mouse, detection is more challenging and less precise, given that they are nocturnal, dwell in underground burrows, and surface only for certain essential activities including foraging, mating, and sand baths. Currently, two methods for monitoring the PPM population are used at Dana Point Preserve, track-tube and live-trap.

Starting in 2011, CNLM used track tubes to monitor PPM using methods developed by experts in the field and following the USFWS survey protocols. Track-tube surveys have been used successfully for monitoring PPM (Brehme et al. 2014), providing information on presence/absence, areas occupied, and—depending on survey design—some phenological and demographic data. This information is valuable in guiding short-term management decisions, helping to reduce the risk of harassment or take of PPM, and determining any trends that may be important for the long-term management of the Preserve. Such surveys may also be an indirect indicator of habitat suitability for PPM. In 2020 a revised, more consistent and robust track tube monitoring design was implemented by CNLM on the Preserve. This updated monitoring design will provide spatial and temporal data for short-term and long-term management on the Preserve and has potential to be compared to and analyzed with species-level data from monitoring efforts of the other two wild PPM populations. However, due to the differences in track-tube monitoring efforts and survey design from 2011 to 2019 and the lack of data prior to the installation of the trail, only live-trap data are presented in this plan as a reference for changes in potential population size.

Live-trapping has been conducted from time-to-time on the Preserve and this can provide confirmation of the presence of the (sub)species and can provide some other indicators of population health (such as presence of both sexes, reproductive status, general health of individuals trapped). Although the number of animals trapped has an uncertain relationship to the actual number of mice on the Preserve, live-trapping provides a general indicator of high, medium, or low numbers overall on the Preserve.

Other reasons for trapping have been to provide individuals for the USFWS's captive breeding program and to allow for collection of samples for genetic testing. Fecal samples have also been collected during trapping with the objective of analyzing diet composition.

Preserve staff have kept live-trapping at a minimum given its highly invasive nature. Stress to the trapped animals is inevitable and accidental deaths are possible. Live-trapping has been conducted in six years since 2008, commencing the year prior to the trail opening (2008) and again in May 2009—with the trail being opened to the public later in the year (Table 4). In May 2009, 82 animals (unique individuals) were trapped—up from 30 trapped the year prior. The number of trapped individuals decreased dramatically over the next three trapping events from 2012 to 2019, with only two animals trapped in 2019. Trapping was most recently conducted in summer 2020, after the Preserve had been closed for over three months due to COVID-19, and the number of individuals trapped was dramatically higher: 77 unique individuals.

Although trapping success can also be associated with trapping "effort" (measured here as trap availability—e.g., one trap deployed for one night = one trap night), similar trapping efforts (e.g., 2009 vs 2012) resulted in very different numbers of mice caught, and high levels of trapping effort (e.g., >1200 trap nights) provided results that varied from 6 to 82 (Table 4). Although the trapping effort in 2019 was low relative to that in 2017, even tripling the outcome (i.e., as a rough estimate of effect of increasing the trapping effort to something similar to 2017) would have still resulted in a low number of mice trapped (hypothetically). The trapping effort in 2020 was lower than that in all the previous years but one since 2008 yet had the second highest number of mice trapped. In general, a high level of trapping will not result in significantly more captures if there is a low resident population; conversely, even a lower trapping effort can result in high trapping results if there is a more robust resident population of mice.

Table 4. Results from all live-trap Pacific pocket mouse monitoring events 2008-2020.

Month(s) and Year of Trapping Events	Level of Effort (trap nights)	Trapping Results (unique PPM)
May – June 2008	3280	30
May 2009[1]	3770	82
May 2012	3330	57
May 2017	2286	6
June 2019	792	2
June 2020[2]	1254	77

[1] The trail was opened to public access in December 2009.
[2] The trail was closed to public access in March 2020.

Many variables and conditions can affect both the number of Pacific pocket mice onsite and the number of trapped individuals including, but not limited to, food supply, vegetative cover and composition, sex ratio, demographics, and influences on above- and below-ground behavior. The latter could include the influence of the visiting public. For example, data collected in 2020 indicated a significant correlation between vegetation management (in this case, removal of some dead vegetation, primarily shrubs) and location of PPM (Brehme et al. 2020). It is not feasible to have an experimental design that allows changes in PPM (or other species) to be attributed to any single factor, as there are many moving parts in a natural landscape, as well as lag effects for some treatments or influences that may complicate the observed patterns. As USFWS and CDFW have noted, "[r]egardless of the cause of the observed fluctuations in the PPM population, the monitoring results clearly illustrate that this population remains vulnerable to extirpation due to its isolation and small population size." (USFWS and CDFW 2022).

Although there is limited ability at present to track changes in PPM genetic diversity over time (due to lack of sampling or modest numbers of mice sampled historically), genetic diversity itself is certainly dynamic—changing over time in response to natural processes including adaptation, migration, genetic drift, and mutation. To some extent, genetic diversity can be influenced, although not directly managed, by providing conditions conducive to effective reproduction and with extreme interventions such as removing or introducing mice. Genetic diversity is the basis for long-term adaptation and very low levels may indicate concern, under certain conditions, for negative effects from inbreeding depression. Recent increased analysis of the mitochondrial genome revealed higher levels of nucleotide and haplotype diversity for the Dana Point PPM population than previously reported (Shier et al. 2022). In fact, the Dana Point population had haplotype diversity almost as high or higher than the other two populations. While this is reassuring information for the Dana Point population of PPM (although this is still based on just a sample from the mitochondrial genome and a sample of Dana Point mice), the information that the Camp Pendleton populations do not have significantly higher diversity (given the size and context of those populations) is somewhat surprising. Further, chromosomal differences that have been detected between the Dana Point population and the two at Camp Pendleton create more challenges in using assisted migration of mice among populations to increase genetic diversity at any of the populations. Although a well-constructed breeding strategy could potentially overcome those barriers, that intervention remains uncertain.

3.4. Changes in vulnerability of Pacific pocket mouse to extinction at the population and species levels

At the time the Preserve was established in 2005, there were only four known populations of the Pacific pocket mouse. In fact, PPM were thought to be extinct beginning in the early 1970s until rediscovered in 1993 at what is now the Dana Point Preserve (Brylski 1993, USFWS 1994). Subsequent to its rediscovery, PPM was found in three additional locations on Marine Corps Base, Camp Pendleton (North San Mateo, South San Mateo, and North Santa Margarita). Although the most recent species-wide status assessment noted that its status has improved since its listing in 1994 with the discovery of those populations (USFWS 2020), PPM, at the species level, has become rarer and hence more endangered since 2005 as PPM have not been documented at one of those three locations (North San Mateo) since 2003 (Natural Resource Assessment Inc. 2003, USFWS 2010). Therefore, it is suspected that this population has since been extirpated, leaving only three wild populations. The PPM population on

Dana Point is the only non-federally owned property where the PPM occurs naturally and has become more important for the persistence of the species.

Further, two of the extant populations—those on Marine Corps Base, Camp Pendleton—are vulnerable to impacts from military training activities. To offset training-related impacts, CNLM and the Department of Defense (DoD) entered into an agreement in 2020, approved by USFWS, to use DoD funding to enhance conditions for PPM on the Dana Point Preserve.

Extinction risk of a species is related to the number of populations and the probability of persistence of each of those populations. With only three populations remaining in the wild, extinction risk of PPM is high even with the efforts towards establishing more populations with captive-bred mice. Establishing new populations of wildlife is challenging and the use of captive-bred mice may provide even more challenges due to some unintended and unavoidable consequences from their more domesticated origin. It will require many years (and PPM generations) before it could be determined whether any new (introduced) populations were truly “established”. Given the current or likely disconnected nature of wild and introduced populations of PPM and the threats that are widespread as well as others that may be more population-specific, all populations would be even more vulnerable to extirpation without professionally implemented adaptive management using all available stewardship tools to avoid, minimize, and control threats.

CNLM has been using stewardship tools to address those threats that can be managed. For example, with respect to vegetation management, increased management resources can be used to best effect for PPM persistence but many factors are largely or totally uncontrollable. While vegetation is manageable to some extent (influencing the amount of ground cover and species composition with trimming and removal, possibly some planting), it is still a function of natural processes and affected by weather conditions and climate change—largely unmanageable factors. Some of the growing threats to the Preserve cannot be directly managed or controlled, such as climate change, or the spread of certain diseases and viruses. Because of the increasing threats to PPM at the both the population and species level, adaptive management requires measures to address known and manageable threats, which include impacts from public access.

3.5. Changes in threats to the natural resources

The Preserve and its habitat and resident species are vulnerable to a number of threats of which we are currently aware. Vegetation condition is somewhat manageable (i.e., is also affected by weather, browsing, insects, and disease, etc.) and both the knowledge base and intensity of management by CNLM have increased over time. As such, vegetation conditions for PPM have likely improved, reducing this somewhat as a threat.

Rabbit hemorrhagic disease virus serotype 2 (RHDV2)—a highly transmissible and frequently fatal disease of rabbits—was documented in California in 2020. RHDV2 has since rapidly spread throughout the state and as of December 2022 the virus has been documented in 20 counties including Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties. This virus can be vectored on shoes and clothing of the visiting public and can persist in the environment for a very long time, making disease control efforts extremely challenging once it is in wild rabbit populations. Infections on the Preserve or its vicinity would not only almost certainly result in the death of the rabbits but have further consequences for the ecosystem. But RHDV2 is just one example of viruses or other causes of extreme disease that will occur from time to time and can be spread by human visitors on the Preserve.

Snake fungal disease (*Ophidiomyces ophidiicola;* SFD) was also recently (2019) confirmed in California (CDFW 2019). SFD affects many snake species and presents a threat to the eight species of snakes found on the Preserve. Cases of SFD can be moderate to fatal. SFD lives in soil and can be transmitted to snakes by direct contact with infected animals or a contaminated environment; spread of the fungus to new locations may occur when people track contaminated soil embedded in clothing or shoes (Cornell University 2019).

Some inherent life-history characteristics make species more or less vulnerable. For example, a relatively short life-span creates a necessity for frequent and successful reproductive events to avoid extirpation. PPM has a short life-span in the wild—the average being approximately one year, although survival for as long as three to five years is not uncommon (French et al. 1967, 1974). Even with some mice experiencing life expectancies at the longer end of the range, PPM populations are very vulnerable to threats that are constant and may have a depressing effect on successful reproduction, or those that are periodic and may severely reduce or completely undermine reproduction for several consecutive years (e.g., years-long droughts).

Climate change is a continuing and expanding influence with uncertain impacts on the Preserve's natural resources. Across southern California, the average annual minimum and maximum temperature increased during the span of 1918-2006, +0.17 °C and +0.07 °C per decade respectively (EcoAdapt 2016a). In addition to the general warming effect of climate change, the occurrence of extreme weather events has also increased (IPPC 2022). Heat wave activity increased across California between 1950-2010, and heat wave conditions (3 or more days with temperatures above 32°C) are projected to occur more frequently in California by the end of the century (Gurshunov and Guirguis 2012), and are expected to last longer, feature higher temperatures, and affect larger geographic areas (Gershunov et al. 2013). Moreover, the probability of co-occurring extremely warm and extremely dry conditions (1.5 SD anomaly) remains greatly elevated throughout the 21st century (Diffenbaugh et al. 2017). While increased annual temperatures will have impacts to the Preserve, it is likely that changes in annual seasonal variability will have a higher impact on the Preserve. Changes in maximum annual temperatures, rather than increased annual temperatures, have been shown to be correlated with local extinction events (Roman-Palacios and Wiens 2020).

Since 2005, the Preserve has experienced some drought effects. The longer-term influences of rapid climate change on weather patterns influencing the Preserve have some uncertainty. Nevertheless, any significant changes from historic patterns will undoubtedly have consequences for the plants and animals onsite (Table 5). Changes in processes such as nitrogen deposition, decomposition, pollination, and soil water recharge could also have onsite consequences. These changing conditions can be stressors on plant and animal life, and consequences could include depressing effects on the food supply and habitat conditions for the Pacific pocket mouse and gnatcatcher, for example. Sage scrub—the predominant vegetation type on the Preserve—does exhibit plasticity in response to drought and precipitation variability; however, altered precipitation timing, soil moisture, and drought severity may affect composition, distribution, and survival of this community. Many sage scrub species are projected to experience a >50% decline in suitable habitat in southern California by mid-century (EcoAdapt 2016b).

Table 5. Projected climate-driven impacts on sage scrub habitat (EcoAdapt 2016b).

Projected Climate and Climate-Driven Changes	Potential Impacts on Sage Scrub Habitats
Variable precipitation, reduced soil moisture, increased drought *Variable annual precipitation; increased climatic water deficit; increased drought frequency and length*	• Altered distribution, species composition, survival, recruitment, germination, productivity, and phenology; potential conversion to more xeric shrub communities and/or non-native annual grassland • Less frequent/larger rainfall events: sage scrub may gain competitive advantage over chaparral and invasive grasses
Increased temperatures and heat waves *+2.5 to +9°C by 2100; increased heat wave frequency and length*	• Altered distribution and species composition • Decreased germination success for some species • Altered susceptibility to exotic invasion
Altered fire regimes *Increased fire size, frequency, and severity*	• Native species declines via resprout mortality and reduced seedbank • Increased exotic species establishment and abundance, potentially exacerbating shifting fire regimes and leading to habitat conversion

The Argentine ant (*Linepithema humile*, Mayr), a non-native invasive ant species, is considered a threat to many native terrestrial species in California and is listed as a global species of concern (ISSG 2021). In California, Argentine ants are more likely to be in high abundance along the coast than inland areas and in urban and agricultural areas more so than large natural open spaces (Mitrovich et al. 2010, Richmond et al.

2021). It is not surprising that, being coastal and urban, Argentine ants are present throughout the Preserve (CNLM 2019). While it is unknown when the Argentine was established in the Preserve, the infestation does appear to be at higher density than when the first CNLM Argentine ant survey was conducted in 2014. At that time, the Argentine ant naïve occupancy estimate (the number of points with ants detected out of the number of points monitored) was 65.6% (82/125 grids) while in 2018 the naïve occupancy estimate was 94.6% (123/130) with more grids (87/130) having a “high number” of Argentine ants present on bait (i.e., >250 individuals) than in 2014 (32/125) (see CNLM 2014 and 2019).

The impact of Argentine ants on the arthropod community has been widely studied in agriculture and in urban and natural settings. Research has shown a negative relationship between Argentine ant presence and diversity of arthropods including native ant species and pollinators in their introduced range (e.g., Lach 2007, Naughton et al. 2020, Richmond et al. 2021)—both of which can impact pollination success (Rankin et al. 2018), seed set, seed dispersion, and germination success of plant species (Carney et al. 2003, Lach 2007). In addition, research has shown negative impacts of Argentine ant infestations on reptile and avian species (e.g., Suarez et al. 2005, Alvarez-Blanco et al. 2020). Within the Preserve, Argentine ants have been documented in failed gnatcatcher nests (K. Merrill pers. comm.). Direct impacts to mammals are less known. However, during PPM trapping events at Camp Pendleton Argentine ants were found in traps with and on PPM (and other small mammal species) (Brehme et al. 2014). Argentine ants are tramp species, likely drawn to the trap for the seed bait, and can quickly monopolize resources including small vertebrates such as PPM, targeting their vulnerable areas (i.e., nose, mouth, ears, and eyes). Argentine ants were also noted scavenging on two dead PPM, which were casualties associated with a live trapping event in 2020 (K. Merrill pers. comm.). While it is uncertain if the ants were the direct reason for the deaths, the negative impacts of Argentine ants on ecosystem health are known (e.g., Carney et al. 2003, Lach 2007, Rankin et al. 2018). As a result, the threat of Argentine ants has been highlighted in recovery plans for threatened or endangered species, including PPM (USFWS 1998). It is possible that Argentine ants directly impact PPM through predation in their burrows (Brehme et al. 2019) by foraging on young, and indirectly through harvesting seed caches. Trash left by visitors (i.e., food and beverages) exacerbates the threat by providing additional resources (sugary drinks in particular) to Argentine ants along the trail, in the adjacent parking lot, and within PPM habitat (K. Merrill pers. comm.)

Ongoing and increasing residential development in the vicinity of the Dana Point Preserve has the potential to increase indirect threats to sensitive species on the Preserve. Such threats include an increase in the number of domestic cats and other non-native and native predators generally associated with human development (crows, ravens, raccoons, red foxes, opossums), as well as negative impacts from vibrations, noise, artificial lighting (USFWS 1998, 2010, Brehme et al. 2013-2020, D. Shier pers. comm.), and recreation (USFWS 1998).

3.6. Public impacts from trail use: scientific research

3.6.1 Introduction

Section 3.8 below describes the challenges in designing an experimental frame that would directly determine impacts of public access on wildlife at the Preserve. As part of adaptive management, CNLM relies on relevant information in the extensive scientific literature on this topic and applies that knowledge and experience to the likely influences and impacts on the Dana Point Preserve.

Given all the influences on species in their natural environments, it is rarely possible to construct an experimental frame that allows one to test the response of a species to a single variable—such as public use of a trail. It is particularly difficult to derive such direct information in a short period of time, or when rare or endangered species are involved (thus limiting the ability to manipulate and place at risk those species). However, science-based information that is relevant to guiding management of conservation areas can be reasonably gained from studies in other locations where the research can be designed more appropriately, conducted over a longer period of time, or accumulated from many sources. Indeed, selection and application of appropriate scientific principles and peer-reviewed scientific literature are the foundation of managing specific natural areas. From this literature review, there is much evidence and reason for concern about the impacts of public use of the trail.

<u>The topic as framed in the literature</u>: The scientific literature on studies of the relationship between public access and natural areas has not only continued to grow, but is now supported by the discipline of recreational ecology—an interdisciplinary field that studies the ecological impacts of recreational activities and the management of these activities. The most basic principle in that field is that if outdoor recreation is allowed in an area, impacts to that ecosystem are inevitable (D'Antonio 2020). The term "passive recreation" is essentially obsolete. One recent collection of papers on recreational ecology was prefaced by the statement that "an increasing body of evidence is emerging that indicates non-consumptive recreational activities like hiking, which [doesn't] involve harvesting of resources, can have harmful effects on species, their habitat, and efforts to protect them" (Unger 2020).

<u>Literature inclusion</u>: For the purpose of this Plan, the literature was queried for studies related to public trails and/or recreation and related impacts, if any, on natural resources. The most recent literature to be included has a publication date of 2023, but not all 2023 publications were yet available for inclusion. The amount of literature queried and included is extensive—given that several systematic reviews of effects of recreation on wildlife were included in addition to over 100 other, individual studies. Due to the amount of literature queried, a table was prepared to provide a means of quick access to key results and context (i.e., taxa, location, objectives, results) and is provided in Appendix A. This is not a comprehensive list but a sample of literature pertaining to public access, anthropogenic disturbance, and the effects on natural resources of public use.

<u>Literature reviews/meta-analyses</u>: The increasing awareness of potential effects of recreation on wildlife has not only led to a proliferation of research but further prompted

systematic reviews and syntheses of these studies (e.g., Larson et al. 2016, Larson et al. 2019, Miller et al. 2020, Dertien et al. 2021, Rosenthal et al. 2022). Larson et al. (2016) reviewed 274 scientific articles that were global in geographic scope and included a broad range of taxonomic groups. The objective of that review was to identify knowledge gaps and assess evidence for effects of recreation. In that review, it was found that 93% of published studies documented at least one effect of recreation on animal species and most of those effects were negative (Figure 7).

In 2019, Larson et al. conducted a meta-analysis of recreation effects on vertebrate species richness and abundance. In this analysis, they parse recreation by terrestrial and aquatic and wildlife by carnivores, herbivores, and omnivores, as well as by taxa (Larson et al. 2019). Another review by Miller et al. (2020) investigated the effects of recreation in the context of public lands and recreation management. They categorized recreational activity into five types based on the use/non-use of motorized equipment, season, and location (terrestrial vs. aquatic) and within these categories, synthesized existing research for each of six taxonomic groupings of species. The authors' objectives were to provide a reference for public land planners and managers, describe management principles, and outline priority research and administrative study areas towards better understanding recreation-wildlife interactions and minimizing negative effects on wildlife while maximizing the benefits gained by recreationists. Another review by Dertien et al. (2020), which included 38 years of effect of non-consumptive recreation on wildlife, identified and quantified "effect thresholds", or the point at which recreation begins to exhibit behavioral or physiological change to wildlife. These authors provided quantitative guidelines for various wildlife groupings (wading birds, raptors, songbirds, ungulates, rodents, etc.) that can be used by planners and natural resource managers for the design of recreation infrastructure and management of recreation activities.

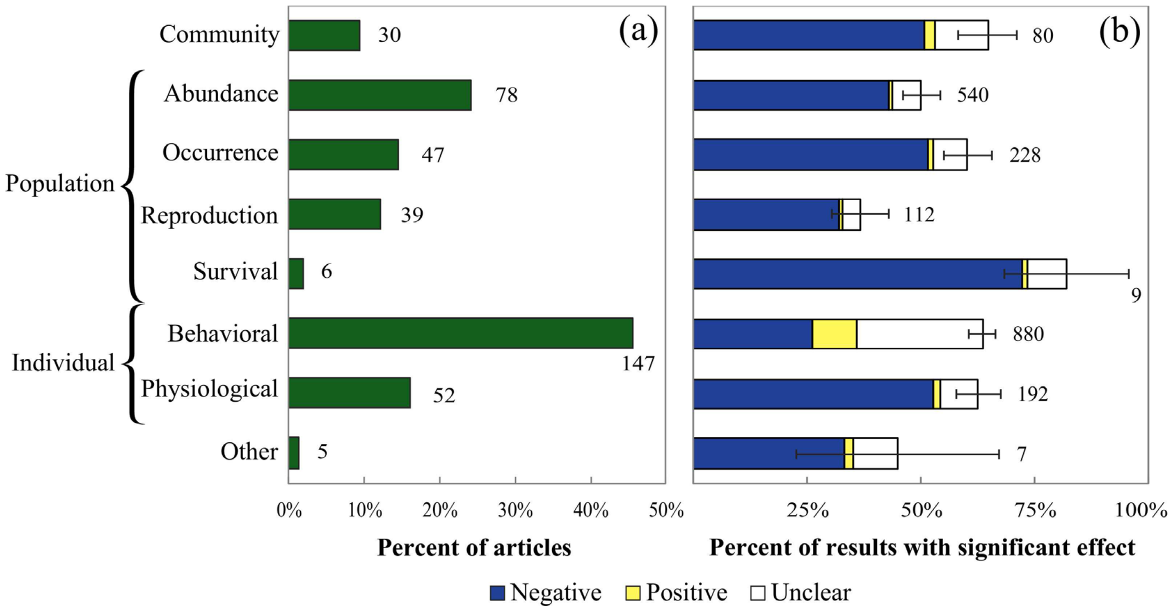

Figure 7. Types of animal responses to recreation from article review (excerpt from Larson et al. 2016). Response types are categorized into community-, population-, and individual-level responses. Panel a) shows the percent of articles in which each response type is tested (numbers of articles follow the bars). Panel b) shows the percent of results in which a statistically significant effect of recreation on an animal species was observed (number of results follow the bars). Total percentages are divided into negative, positive, and unclear effects of recreation. Error bars show standard error for the sum of all effects.

The final systematic study that was reviewed provided a comparison of the threats that affected species at risk. Specifically, a database of Canadian species “at risk” as defined by the Species at Risk Act (2002) was queried and potential threats to 280 “at risk” species (that could include populations or varieties described as species in the database) were compared for relative impact. Recreation activities were one of the five threat categories identified. Although the records for recreational impact for these species ranged from negligible to low, such (recreational) activities affected more species at risk than any other category of threat. When negligible and unknown effects were excluded, recreational activities were the third-greatest threat, after invasive species and roads/railroads (Rosenthal et al. 2022). The authors pointed out that while recreational activities presented no higher than a medium intensity threat to the at-risk species, increases in recreational use and cumulative effects could result in more significant impacts. They further emphasized the importance of managing recreational activities in natural areas, since recreational activities tend to occur in natural areas often set aside specifically for the protection of rare species and habitats.

Reports on positive effects from public visitation: The literature review affirmed the importance of context when applying research results. The majority of studies reported negative effects on wildlife—see, for example, the meta-analysis by Larson et al. (2016). However, some studies did report “positive effects” from public visitation. For those studies, the reason for positive effects was usually due to one of the following explanations:

1) Habituation and/or increases in biodiversity (even if due to increases in non-native species) were considered positive.
2) Public visitation was tied to financial support for the conservation area and suffered if tourism was reduced.
3) A positive effect was recorded for some species because a negative effect was recorded for another (e.g., large- and medium-sized carnivores were negatively affected, moving away from the human-influenced areas. Small mammals (deer mice and woodrats) evidently benefited, increasing habitat use and foraging (Suraci et al. 2019).

None of these positive effects are relevant to PPM and the Dana Point Preserve. Habituation (see Section 3.7) may not occur and would likely have negative effects if manifest at all. The value of biodiversity in this conservation context would not include the presence of non-native species (e.g., domestic cats, weeds). There is no financial benefit to the Preserve or PPM from public visitation. Relevant PPM predators at Dana Point (e.g., fox, racoon, domestic cat) are attracted to, rather than displaced from, human activity.

Results from COVID-related park closures: More recently, the COVID-19 pandemic, with its associated closures of many public parks and preserves, provided an unprecedented experimental frame in which to evaluate wildlife and other natural resource responses to exclusion of the public for some time. (The authors acknowledge that the opportunity provided to scientists by COVID-19 closures of natural areas was and remains a tragic occurrence.) Although there were many anecdotal observations of unusual wildlife sightings and interactions when parks and preserves were closed, some formal studies were also undertaken, although all may not yet be assessable given the time typically involved from study initiation to publication in a scientific journal.

In one recently published study, the authors used the “natural experiment” of the COVID-19 closure within a heavily visited and highly protected national park (Glacier National Park, MT, USA) to examine how “low-impact” recreational hiking affects the spatiotemporal ecology of a diverse mammal community. Using camera traps to record wildlife observations when the park was closed and then subsequently open to recreation, the authors found consistent negative responses to human recreation across most of the assemblage of 24 species. Those negative responses were manifest as fewer detections of wildlife, reduced site use, and decreased daytime activity. The authors noted that “the dual mandates of protected areas to conserve biodiversity and promote recreation have potential to be in conflict, even for presumably innocuous recreational activities” (Anderson et al. 2023).

<u>Extent of negative effects from public interactions with wildlife</u>: Negative effects related to recreational disturbance have been documented across a wide variety of species and taxa including, mammals, birds, reptiles, amphibians, and even invertebrates (e.g., Steven et al. 2011, Bennett et al. 2013, Larson et al. 2019). In general, damaging effects on animals resulting from recreation activities include reduced reproductive success (Beale and Monaghan 2005), declines in abundance and occurrence (Reed and Merenlender 2008), modified habitat use (George and Crooks 2006), and altered species richness and community composition (Kangas et al. 2010). Disturbance from recreation may have both immediate and long-term effects on wildlife. The immediate response of many animals to disturbance includes physiological stress, change in behavior (interruption of foraging, fleeing), or altering reproductive behavior (Persons and Eason 2017, Gutzwiller et al.1994, Arlettaz et al. 2007). Over time, energetic losses

from flight, decreased foraging time, or increased stress levels come at the cost of energy resources needed for individuals’ survival, growth, and reproduction. The cumulative, compounding adverse effects of predator-avoidance behaviors can have impacts on fecundity and every component of offspring survival, with long-term implications for population growth (Allen et al. 2021).

Human disturbance on wildlife from non-consumptive recreation can result in altered spatiotemporal habitat use (Kangas et al. 2010), extirpate wildlife from otherwise suitable habitat, or cause animals to shift geographically into areas of lower quality habitat to avoid areas with human activity (Taylor and Knight 2003, Ficetola et al. 2007, Finney et al. 2005, Kangas et al. 2010, Mallord et al. 2007, Dertien et al. 2021). Thus, recreational disturbances can both reduce habitat suitability and ultimately result in functional habitat loss (Gutzwiller et al. 1994, Frid and Dill 2002, Tost et al. 2020). Fragmented habitats may present unique stressors if there is no adjacent habitat for animals to relocate to, forcing individuals to remail in proximity to disturbance that they would otherwise avoid (Frid and Dill 2002).

There is much complexity in studying, and then understanding, the interaction between recreational activities and wildlife response. Conceptual frameworks can assist in structuring such complexity and informing experimental designs. One such framework identifies three important factors or “modulators” in these interactions: wildlife, human, and context (Figure 8, Tablado and Jenni 2017). The framework represents increasing levels of complexity in the mechanisms for wildlife response—from sensory detection; to short-term behavioral changes and physiological responses; to changes in survival, reproduction, spatial use of the habitat, and chronic stress; and finally, changes in population trends and distribution. These levels of complexity also mirror the level at which the effect is occurring: from individual- to population-level, and the latter then also affecting species-level condition. In a review of global literature on wildlife-recreational interactions, many of the articles reviewed reported impacts at both the individual- and population-level, and of the former, the most often noted were behavioral impacts (Larson et al. 2016, Figure 7).

At the individual level, wildlife-recreational interactions can elicit responses that are generally categorized as behavioral or physiological. Behavioral interactions can be both short term and longer term and can be innate (perhaps genetic) or learned, or a combination. Examples of short-term and longer-term behavioral responses have been provided in a recent literature review and analysis of such interactions (Table 6, Miller et al. 2020). The responses are highly variable (from attraction to avoidance, and from habituation to sensitization)—thus emphasizing the complexity of these interactions and their dependence on the specific human, wildlife, and context “modulating factors”.

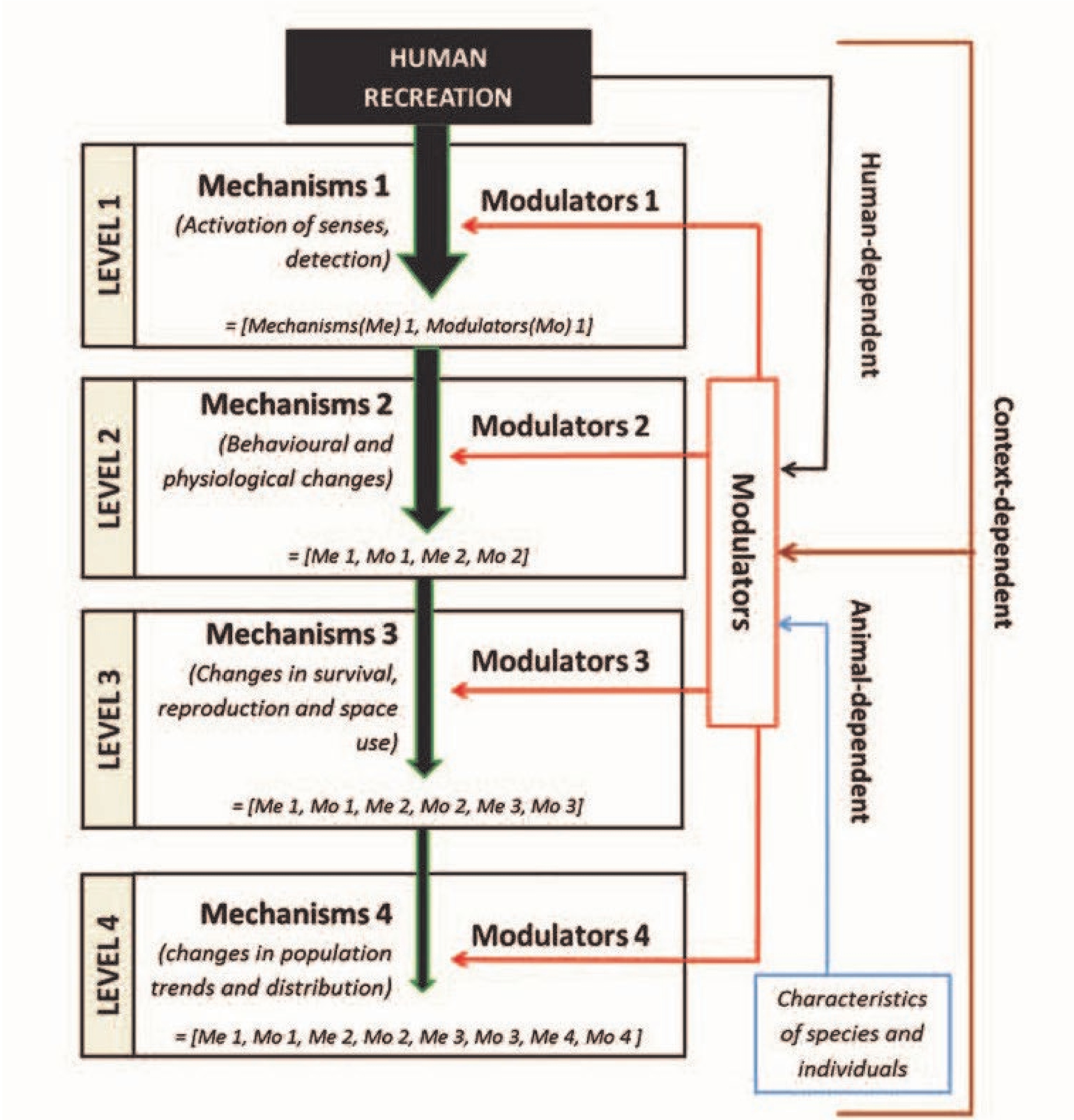

Figure 8. Conceptual framework showing different levels in the processes of human-wildlife interactions (excerpt from Tablado and Jenni 2017).

Table 6. Short-term and long-term learned behavioral responses of wildlife to human activity (excerpt from Miller et al. 2020).

Behavioral response	Definition	Example	Source
Short-term responses:			
Attraction	The strengthening of an animal's behavior because of rewards or positive reinforcement.	A chipmunk is attracted to areas where recreationists leave food.	Knight and Gutzwiller 1995
Avoidance	The strengthening of an animal's behavior because of persecution or negative reinforcement.	Grizzly bears in an area with high human activity levels often flee from people, while those in an area with no or little human activity do not.	Knight and Gutzwiller 1995
Tolerance	Intensity of disturbance that an individual tolerates without responding in a defined way.	Terns ignore heavy vehicle and boat traffic. This is measured in the short term, and evidence of this tolerance increasing over time is absent.	Nisbet 2000
Long-term responses:			
Habituation	Waning of a response to a repeated stimulus that is not associated with either a positive or negative reward.	Birds habituate to stimuli that are predictable and nonthreatening, such as road traffic, but are startled by sudden and unpredictable noises such as gun shots.	Eibl-Eibesfeldt 1970
Sensitization	Increased behavioral responsiveness over time when animals learn that a repeated or ongoing stimulus has significant consequences for the animal.	Avoidance of noise or other stimuli associated with danger; entails an increased energy expenditure to avoid danger.	Richardson et al. 1995

In the following sections, there is continued discussion of the relevant literature, beginning with a description of the ecology of the Pacific pocket mouse so as to better allow connections to be made with potential influences or threats to this subspecies. Following that, the literature has been categorized by general taxonomic groups: vertebrates, invertebrates, and habitat and vegetation communities. Given the likelihood that dogs would be perceived as a threat to PPM and that they are occasionally brought onto the Preserve by visitors, some literature is presented that examines wildlife responses to domestic dogs. Finally, the topic of habituation is explored, given that it is a potential modulator in the response of wildlife to public recreation on the Preserve.

3.6.2. Pacific pocket mouse ecology and impacts from human disturbance

The Pacific pocket mouse is a nocturnal, aggressively solitary, and semi-fossorial rodent in the family Heteromyidae that is physiologically adapted to warm and dry climates (USFWS 1998). It is the smallest subspecies of the little pocket mouse (*Perognathus longimembris*), generally ranging between 7-9 grams in adult body mass (USFWS 1998). Adults weighing as little as 5 grams and as much as 12 grams have been trapped on the Dana Point Preserve (K. Merrill pers. comm.). Average life expectancy in the wild is approximately 1 year, with survival for as long as 3–5 years not uncommon (French et al. 1967, 1974). This short life expectancy contributes to the population's vulnerability: significant impacts to even one reproductive cycle could have serious consequences for the sustainability of the population.

The onset of breeding is typically in early spring and lasts through July (USFWS 1998). The time period during which a female PPM is in peak estrus can be extremely limited (i.e., as brief as one hour per cycle, D. Shier pers. comm.). Disturbance during this time could dissuade reproductive behavior. Females gestate young for approximately three weeks and wean after 30 days.

Reproduction is also influenced by food availability. In fact, reproduction may not occur in years of low food resources (Brehme et al. 2019) but in high resource years, adult females in the wild may have up to two litters, with their female offspring mating and reproducing concurrently in a single season (Miller and Pavelka 2008). PPM is largely granivorous, specializing on grass and forb seeds (USFWS 1998). A positive relationship was found between forb cover and PPM occupancy at Marine Corps Base Camp Pendleton (MCBCP, Brehme et al. 2014) and at the Preserve (Brehme et al. 2020). Genetic analysis of PPM scat has shown that diet varies across populations and that within one season, regardless of available seed resources from shrubs and grasses, they tend to select a wide variety of forb species (Iwanowicz et al. 2016). Years with low forb growth and early forb die-offs have been associated with PPM declines (Brehme et al. 2019). Food availability is thus related to successful production of grass and forb seeds (for the most part) on site—which is, in part, weather-related. Considerable research has tied reproduction in heteromyids and other desert rodents to precipitation (Beatley 1969, Kenagy 1973, Reichman and Van De Graaff 1975, Kenagy and Bartholomew 1985). But food availability can also be influenced by competition from other species for the same food resources, loss of food sources from insects and disease, and destruction of plants from trampling or picking.

PPM create and live in burrows beneath the soil surface, and cache seeds below ground and within burrow systems for sustenance throughout the year (e.g., Randall 1993). More recent research has provided evidence that both pit caches and larders may be used (Chock et al. 2019). In sand dunes in Oceanside, CA, burrows were found approximately one foot below the surface under vegetation edges and ended in a single nest chamber (Bailey 1939). Burrows and tunnels can sometimes be even closer to the surface—as little as 1 to 4 inches below ground (D. Shier pers. comm.). As such, sounds and vibrations from above-ground disturbances such as trail users, could affect PPM below ground. In sandy habitats, burrows are particularly vulnerable to compaction by foot traffic. Brehme et al. (2014) reported a strong negative effect of human foot traffic on PPM occupancy. Although much remains to be studied regarding burrow architecture, recent observations have indicated that the height of the burrows may be very shallow (e.g., 1 inch)—further indicating their vulnerability to collapse.

Pacific pocket mice, while remaining below-ground for substantial amounts of time, of course need to conduct life-sustaining activities at the surface including feeding and food collection, selecting mates and mating, territory exploration and expansion, and bathing (i.e., sand baths). The average PPM core home range size is estimated to be 0.017 hectares, or ~13 meters in diameter (Shier 2009) but individuals have been recorded traveling 181 meters in a single night, with average movement distances reported of 10 meters to 30 meters between successive captures (Dodd et al. 1998, 1999, Miller and Pavelka 2008). Mark-and-release studies indicate limited adult movement and juvenile dispersal distances (Swei et al. 2003).

PPM above-ground activities are typically conducted at night or during low-light levels. As such, artificial night-time lighting may cause problems for nocturnal rodents such as the Pacific pocket mouse, through potential modification of predation rates, obscuring of lunar cycles, and/or causing direct habitat avoidance (USFWS 1998, Shier et al. 2020). A study of the effect of different levels and orientation of (artificial) night lighting on PPM at Marine Corps Base Camp Pendleton indicated that anthropogenic light negatively affected foraging of PPM (Wang and Shier 2017).

Additionally, the presence of humans during low-light levels of the day (towards sunset or for some time after sunrise, and as influenced by fog or cloud cover) likely also impacts PPM behavior and shortens or discourages such essential activities by altering their perceived predation risk (Persons and Eason 2017).

PPM use seasonal heterothermy (winter torpor and facultative summer aestivation) in response to environmental stresses of food shortage and/or low temperatures (Chew et al. 1965, Bartholomew and Cade 1957). The onset of torpor is marked by a large drop-off in activity that can occur from June to November and is highly spatially variable within and among years (Meserve 1976a, Shier 2009, Brehme et al. 2014, 2020). During torpor, the mice alternate between periods of dormancy and feeding on cached seeds. Periods of dormancy have neither a daily nor strictly seasonal pattern (Brehme et al. 2014). In captivity, dormant individuals may show some activity each day within their burrows. Emergence typically occurs in late winter to early spring (February-March) and is thought to coincide with seed availability (Meserve 1976b). It has been suggested that the trigger for emergence may be changes in soil temperature (French 1977).

As the beneficial aspect of torpor or aestivation is to reduce energy expenditure, any disturbance that disrupts these states can have a negative effect. Again, such disturbances could include human-caused sounds or vibrations—especially if burrows are shallow and/or close to the surface. Further, because Heteromyids have expanded middle ears, they are especially sensitive to low frequency sound (D. Shier pers. comm.).

Another variable that may be useful in an experimental framework to study wildlife-recreational interactions is distance from the source of the potential disturbance. The source could be a trail, for example, and potential impacts measured for a variety of species at varying distances from the trail (assuming the trail is regularly used for recreation). Reasonably, the effects may be related to the spatial scale at which various species occupy and use the area, and perhaps also may be seasonally dependent (e.g., populations may be more or less sensitive during certain stages of a life-cycle). In a recent study to examine potential impacts of public access to trails, “threshold buffers” (distances from the trail within which effects might be expected to occur) were determined for three taxonomic groups (perching birds, ungulates, and apex predators) (Dertien and Larson 2018). Given the meandering nature of the public trails, these trail buffers overlapped almost all of the subject property, resulting in no contiguous areas across the property that were free from potential recreation effects.

Using a similar approach for the Pacific pocket mouse population at Dana Point, three “distance zones” (or threshold buffers, using the previous terminology) were superimposed on the Preserve to provide a sense of how this concept might be experienced. Three zones—13, 50, and 100 meters from the trail—were mapped (Figure 9). Given the meandering nature of the trail, even the shortest (potential) impact zone (13 meters) covers a significant portion of the Preserve (16%). That distance was selected on the basis that this may be the average diameter for PPM core home range (Shier 2009). The other two distance zones, 50 and 100 meters, reflects some literature that found that smaller rodent species avoided areas within 50-100 meters of trails or people (Dertien et al. 2021). At 100 meters, almost 90% of the Preserve is included in the potential impact zone, which does not include impacts from the adjacent parking lot and roads. If those (latter) impacts are included the threshold buffer for the Preserve, the entire Preserve would be potentially impacted.

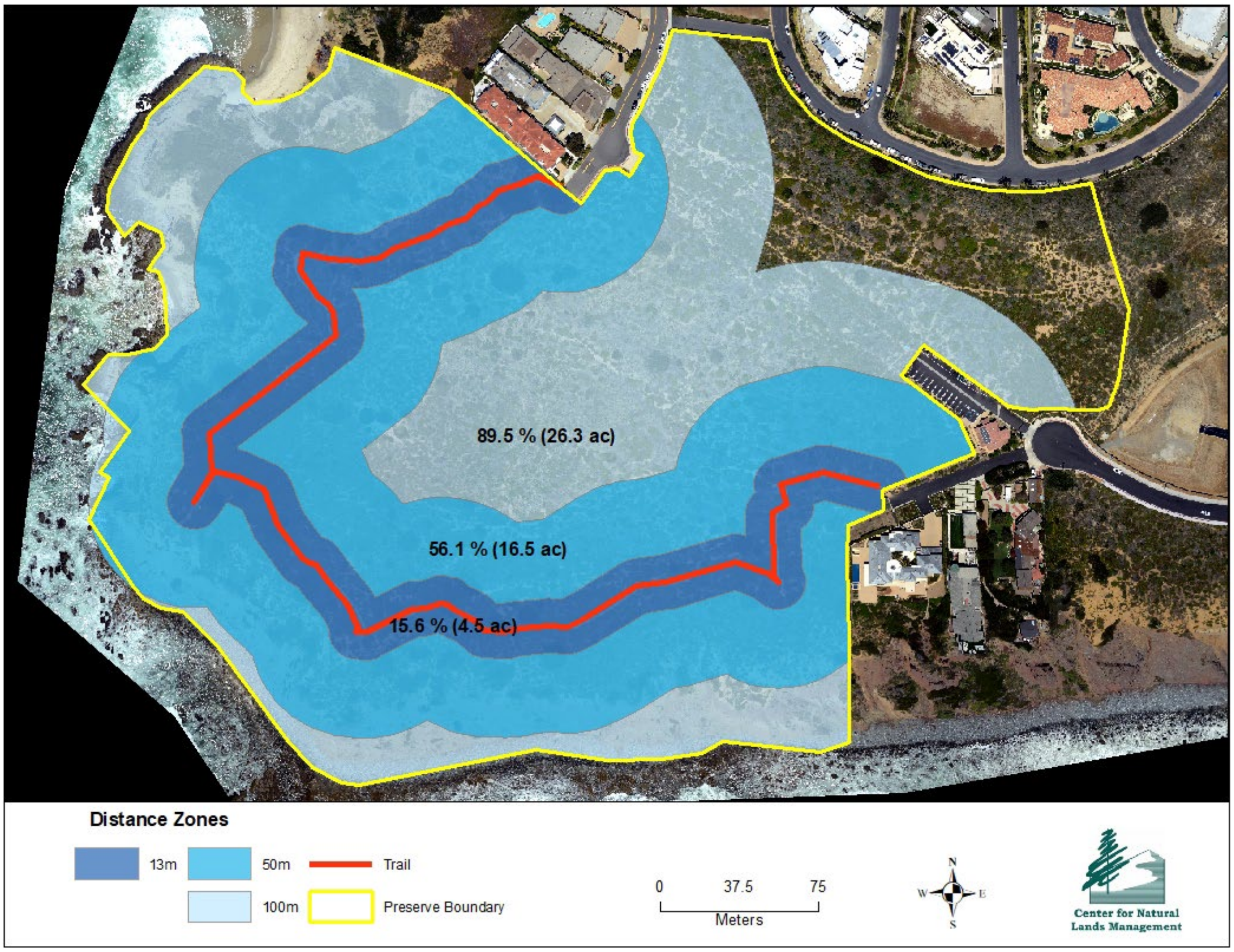

Figure 9. Zones of varying distance (13 meters, 50 meters, 100 meters) from the trail at the Dana Point Preserve. Values show proportion (%) and area (acres) of the Preserve covered by each zone.

3.6.3. Impacts on vertebrates

Across many vertebrate species, species richness and abundance are lower in association with higher levels of recreation, and the negatives effects of recreation appear to be most pronounced for birds and mammals (Larson et al. 2019). Research on impacts to reptiles and amphibians are less represented but the majority of existing studies have found effects are negative (Miller et al. 2020). Even quiet recreation such as walking and wildlife viewing can have significant negative impacts on vertebrate wildlife (Papouchis et al. 2001, Arlettaz et al. 2007, Reed and Merenlender 2008, Hennings 2017), such as increased time spent in flight and vigilance behaviors (Naylor

et al. 2009). Disturbance increases with intensity (a combination of people per day, noise level, and speed) of recreational activity, and is greater in response to less predictable activities (Shutt et al. 2014, Miller et al. 2020).

Indirect effects of increased human presence can occur when humans create an environment of higher predator pressure or cause animals to temporally shift their activities to avoid human activity. In an urban park, white-footed mice (*Peromyscus leucopus*)—primarily a crepuscular-nocturnal forager—spent less time foraging in areas of high human use even though people were not allowed in this park after dusk, possibly due to increased predator presence along trails (Persons and Eason 2017). Temporal shifts to avoid human activity can cause some species to become more nocturnal; such "diel shifts" can bring predator-prey species into greater overlap, with increase predation risks (Patton et al. 2019), or lead to suboptimal foraging conditions (Wheat and Wilmers 2016)

Artificial illumination (artificial light at night; ALAN) is an increasing form of human-caused disturbance that can affect vertebrate behavior and ecology. Small prey species may be particularly susceptible to ALAN as it makes them more conspicuous and thus more vulnerable to predation by visual predators. A study by Shier et al. (2020) examined impacts of ALAN on foraging decisions of the endangered Stephen's kangaroo rat (SKR, *Dipodomys stephensi*). ALAN decreased the probability of resource patch depletion compared to controls, indicating that ALAN reduced habitat suitability for this at-risk nocturnal rodent.

The presence of recreational trails in natural areas can limit the abundance or density of some bird communities (e.g., Bötsch et al. 2017), particularly of those species which nest or forage on the ground (Thompson 2015). For birds, impacts associated with trails may be due to interference with breeding behavior (Gutzwiller et al.1994), a reduction in foraging time (Frid and Dill 2002), alteration to vegetation structure near trails (Fernández-Juricic et al. 2001), the introduction of invasive species (Loss and Blair 2011), or increased presence of nest predators (Miller and Hobbs 2000). A review by

Steven et al. (2011) that included 69 research papers on the effects on birds of non-motorized recreation, found that 88% of these studies reported negative effects, including impacts to physiology, behavior, abundance, and reproduction.

Increased anthropogenic noise can interfere with avian acoustic communication (Slabbekoorn and Ripmeester 2008, Barber et al. 2010). Impaired communication resulting from anthropogenic noise has been linked to altered predator avoidance behaviors (Anze and Koper 2018), lower lek attendance in greater sage-grouse (*Centrocercus urophasianus*) (Blickley et al. 2012), reduced pairing success in ovenbirds (*Seiurus aurocapilla*) (Habib et al. 2007), and impaired nestling development in house sparrows (*Passer domesticus*) (Schroeder et al. 2012), indicating that the impacts of noise on communication have the potential to interfere with reproductive processes. Anthropogenic noise may function as a deceptive signal to wildlife, causing animals to engage in false responses that may be energetically and biologically costly. Evidence of this is provided by a study of endangered SKR, in which traffic noise not only masked but also mimicked foot-drumming signals (Shier et al. 2012). For vulnerable species such as SKR, the combined effects of communication disruption and signal deception may further tax already endangered populations.

3.6.4. Impacts on invertebrates

Predator-avoidance responses are not limited to vertebrates. Endangered Karner blue butterflies (*Lycaeides melissa samuelis*) were found to be sensitive to recreational disturbance and responded to recreationists as they would from natural threats, such as predators (Bennett et al. 2013). Through simulations these authors determined that regular disturbance could reduce egg laying potential and significantly restrict host plant choice, which in turn, could impact the butterfly's population dynamics. Invertebrates including butterflies, ground beetles, and spiders can also be affected by changes in vegetative structure (Blair and Launer 1997, reviewed in Miller et al. 2020). Butterfly species richness and diversity were lower in recreational areas as compared with biological reserves where recreation was prohibited (Blair and Launer 1997). Other

general anthropogenic impacts to insect populations can result from light pollution. ALAN strongly reduced moth caterpillar abundance compared with unlit sites, affected caterpillar development, and disrupted the feeding behavior of nocturnal caterpillars (Boyes et al. 2021).

3.6.5. Impacts on habitat and vegetation communities

Recreation can impact wildlife habitat by altering soil characteristics, water quality, and vegetative communities (Cole 1995, Barros and Pickering 2017, reviewed in Miller et al. 2020). Direct impacts to habitat and vegetation from trail use include through a loss of vegetative cover (Cole 1995, Barros and Pickering 2017), a decrease in vegetation biomass, or damage to tree and shrub seedlings (Sun and Liddle 1993). Recreational trails can function as corridors that facilitate the spread of non-native plant species into wildlands (Underwood et al. 2004, Wells et al. 2012, Liedtke et al. 2020). Trailheads, in particular, have been found to harbor high diversity and abundance of non-native plants within the seedbank and may function as a source point for invasions into protected areas (Wells et al. 2012). Additional indirect effects of recreation on vegetation community can occur when humans facilitate the spread of pathogens. The exotic pathogen, *Phytophthora ramorum*, for example, which is the cause of Sudden Oak Death, is likely spread by humans both within already infected areas and to novel locations (Cushman and Meentemeyer 2008).

3.6.6. Impacts of domestic dogs

The presence of pets and companion animals in open space and other protected areas may also cause direct and indirect impacts to wildlife species (Reilly et al. 2017). The effects of domestic dogs (*Canis lupus familiaris*) on wildlife have been reviewed extensively and disturbances to wildlife from domestic dogs and dog-walking are well documented (Banks and Bryant 2007, Steven et al. 2011, Hennings 2016, Reilly et al. 2017). Dogs are a domesticated subspecies of wolf and their presence and scent

(which remains after dogs are gone) repels many wildlife species and incites antipredator responses (Epple et al. 1993).

A review by Hennings (2016, 2017) on the effects of dogs concludes that (1) people with dogs on leash, and even more so off-leash, are more alarming and detrimental to wildlife than any non-motorized recreational user group without dogs and that (2) people with dogs substantially increase the amount of wildlife habitat affected. The effects of dogs may be long-lasting and linger after the dog is gone, because the scent of dogs repels wildlife (Epple et al. 1993). It may be, too, that wildlife do not habituate to dogs (particularly off-leash dogs) because wildlife perceive dogs as predators, and because their behavior can be unpredictable (Banks and Bryant 2007, Weston and Stankowich 2014, Hennings 2016, Gomez-Serrano 2021).

People with dogs may represent the highest disturbance type of recreation for birds (Miller et al. 2020, Gomez-Serrano 2021). Dog walking in woodlands lead to a 35% reduction in bird diversity and 41% reduction in abundance, not just in areas where dog walking was common, but also where it was prohibited (Banks and Bryant 2007). Moreover, this study found no evidence of habituation even with leashed dogs and even where dog-walking was frequent; the disturbance was much weaker for people than dogs (Banks and Bryant 2007). Studies in California and Colorado showed that bobcats avoided areas where dogs were present, both in terms of spatial displacement (George and Crooks 2006, Lenth et al. 2008, Reed and Merenlender 2011) and temporal displacement in which bobcats switched to nighttime for most activities (George and Crooks 2006). In Colorado, mule deer showed reduced activity within 66 meters of trails where dogs were prohibited (i.e., response to people only), but within 100 meters of trails where dogs were allowed (Miller et al. 2001). Similar effects were also found for small mammals, including squirrels, rabbits, chipmunks, mice, prairie dogs (Bekoff and Ickes 1999, Lenth et al. 2008), and marmots (Griffin et al. 2007).

3.7 Habituation of wildlife to human disturbance

First described in the field of neuroscience, habituation is a concept that should be considered relative to potential impacts of the visiting public on wildlife. As applied to wildlife ecology, habituation has been defined as “a decrease in the strength of a response after repeated presentations of a stimulus that elicits that response” (Mazur 2006). As such, habituation typically is viewed as a negative consequence of human interactions with wildlife due to the likely consequential reduction of population fitness arising from, for example, reduced danger flight response (Higham and Shelton 2011).

Habituation would not be expected to result from all stimuli or impacts. For example, habituation to the presence or activity of dogs is highly limited (Hennings 2017, Gomez-Serrano 2021). This limitation is likely related to the unpredictable, erratic behavior and movements of domestic dogs, which influences three key factors wildlife use to judge the threat of predation: predictability, proximity, and speed (Glover et al. 2011, Weston and Stankowich 2014). Similarly, there is less likelihood of habituation to public use of trails because of the unpredictable and always changing noise levels and quality (e.g., different voices), smells, movements, and vibrations (e.g., different weights of individuals or groups at different times of day).

Habituation, were it to occur, would be very difficult to study. First, given that habituation is experienced at the neural and physiological levels, this results in a poor fit between observable animal behavior and internal state (Ellenberg et al., 2006). In other words, the apparent tolerance of some wildlife species to human presence does not necessarily mean that these wild animals are not being impacted (Higham and Shelton 2011). Further, there is evidence from wildlife studies that propensity toward habituation varies not only by species but by sex, breeding status, and even individual temperament (Papouchis et al. 2001, Martin and Reale 2008), Papouchis et al. 2001, Gómez-Serrano 2021).

Bejder et al. (2009) explain that what may seem like wildlife tolerance of human stimuli may, in fact, arise from various factors including:

> (1) Displacement: e.g., less tolerant individual animals may be displaced, resulting in a bias towards more tolerant animals that remain at a given site.
> (2) Physiology: e.g., reduced responsiveness to human stimuli due to physiological impairment.
> (3) Ecology: e.g., lack of suitable adjacent habitat to which animals may otherwise relocate.

In other situations, exposure to human activity can cause animals to shift temporal activity patterns (e.g., Frid and Dill 2002). In all of these cases, there is actually a negative impact from human presence but the result may appear to be tolerance or habituation.

Species that are more likely to habituate to recreation-related disturbances are often habitat generalists, and some studies have documented habitat generalists moving into a disturbed area while habitat specialists become displaced (e.g., Ballenger and Ortega 2001, Rolando et al. 2013). Some habitat generalist species, such as crows and ravens, may also represent additional predation pressure on the resident community. Predator, meso-predator, and prey species can also be differentially affected by recreation and these dynamics can lead to altered wildlife community composition (Miller et al. 2020). On the Dana Point Preserve, habituation, if it occurs at all in wildlife, may be most expected in some species as foxes and raccoons, predators to PPM.

3.8 Experimental design for assessing public use effects

Designing an experiment to study the impact of public access to the trail at the Preserve on the sensitive species at the Preserve faces numerous complications and challenges, including:

1. Masked effects: Many wildlife species may exhibit apparent tolerance to human disturbance, which may mask or mitigate long-term effects of disturbance (Nisbet, 2000, Baudains and Lloyd 2007, Jimenez et al. 2013, Geffroy et al. 2015). See the previous discussion regarding habituation.
2. Internal vs. external response: The effect is likely to be mediated through a physiological reaction and related consequences. The monitoring of physiological responses is very invasive and involves a study design of trapping mice which itself would illicit a physiological response that could not be disentangled from the response to public presence, not to mention the lag time (see next point).
3. Time between public presence and wildlife response: There may be lag in response, thereby further disconnecting the cause from the effect. In some cases, the impacts may be direct and obvious (e.g., vegetation or burrows trampled when by public, birds scared from nests), but many potential effects would extend beyond the time of impact (e.g., stress from public access, that may then manifest in weight loss, abortion, lower reproduction rates, etc.).
4. Cumulative effects: There could be several to many potential stressors which are additive towards a threshold of consequence. There are no doubt other stressors and impacts from natural, introduced, or anthropogenic causes (see previous sections). Disentangling those individual effects—particularly as they may not be apparent and would vary over time—is not feasible.
5. Variation in effects: As previously discussed, the effects from public presence are reasonably not expected to be the same for all individuals (e.g., of PPM) and may additionally vary by sex, time of day, season (i.e., either weather-related or related to life-cycle stage such as breeding season).

6. No treatment option: Determining effects from certain conditions is often investigated as a set of “treatments” for those conditions—typically ranging from control (no treatment) to putatively below-threshold treatments, to above-threshold treatments. If public presence is considered a “treatment” for which we seek a measurable response, we are limited in imposing any treatments or conditions that would potentially cause harm or “take”. This undermines the efficacy of this approach.
7. Small size of the Preserve: Any design that involves contrasting different public use scenarios is limited by the small size of the Preserve. Further, other factors (e.g., vegetation status, microclimate, perhaps distance from parking lot or other disturbances) would need to be controlled for or similar for all the public use scenarios—requiring a much larger area than available. That is, the preponderance of confounding effects would undermine any such approach.
8. Absence of “control” area or plot(s): More than 56% of the Preserve is within 50 meters of the trail and 90% is within 100 meters of the trail. With potential impacts from public presence within those zones, there is little opportunity to establish a “control” or unimpacted area during public access. Further, areas outside of those zones would need to be comparable in habitat quality and known PPM use to be used as control areas. Based on data collected to date on patterns of PPM distribution, there would be no satisfactory control area.

The most direct measurements of PPM presence and impacts on presence from trail use comes from live-trapping data of PPM (less inference than from track-tube monitoring) and from lengthy periods when public was not present as compared to lengthy periods when the public was present. Those data are presented in Table 3. Data collected from before the trail was open to the public probably cannot be reproduced except possibly after very long periods of trail closure. However, other conditions have changed since then as well. These data, although superficially seeming to be the most “black and white” depiction of effects, still are affected by confounding conditions (e.g., changes in site conditions due to management impacts on vegetation, weather, other stressors) and cannot serve on their own to provide complete information.

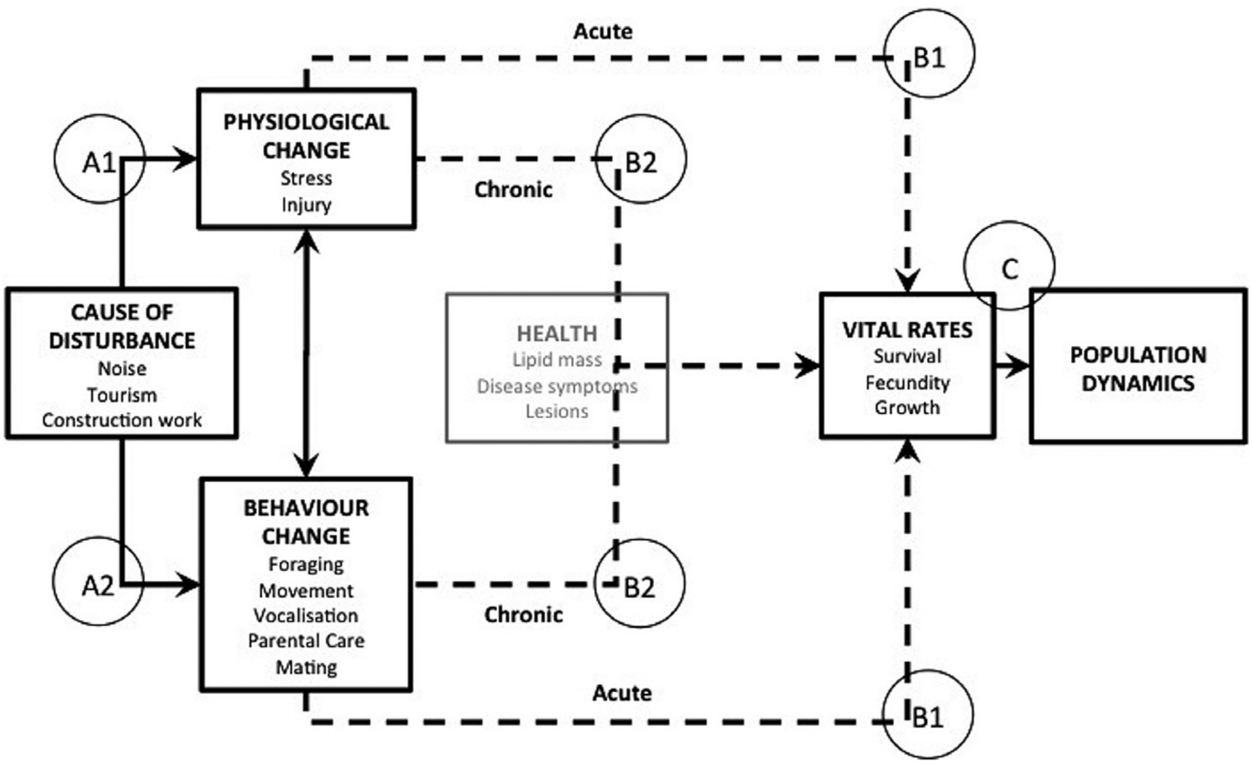

Figure 10. The interim population consequences of disturbance framework (excerpt from King et al. 2015). Circled letters identify transfer functions describing the relationship between the variables at either end of the arrow. Dotted lines indicate transfer functions that have been parameterized using expert elicitation.

Acknowledging the limitations and challenges of experimental design imposed by a small, limited site; a focal species that is endangered; a focal species that is cryptic given its largely under-ground presence; and a history of public access that potentially affects most of the Preserve; we nevertheless sought monitoring guidance from the scientific literature that may be applicable and useful for the context of PPM and the Dana Point Preserve. The authors of a study of potential public trail use impacts on wildlife that was undertaken recently in northern California provide some key elements for monitoring that may be more feasible to implement (Dertien et al. 2018). Their recommendations for monitoring to assess future changes in recreation and wildlife include the following:

1. Implement long-term monitoring: A long time series of data is needed to document whether wildlife detections, habitat use, or species richness are changing in correlation with increasing or decreasing human recreation and to inform adaptive management decisions.
2. Complete trail maps: The full spatial footprint of human recreation activity on the landscape is essential. For the Dana Point Preserve, this is well described by the current footprint of the trail, but additional data are provided by known instances of trespass (off-trail public use).
3. Monitor human recreation patterns: To assess impacts on wildlife, the potential stressor (human presence/activity) must be documented and measured to the greatest extent practical. In the case of the 2018 study, the authors employed camera traps as well as any other available information. They further recommend the use of on-the-ground technicians directly observing human recreation activity, social surveys of visitors, or expert opinion surveys of land managers who can provide valuable information to guide future management decisions. For the Dana Point Preserve, even more quantitative information on public use is available through the use of counters at the trail entrances. Additional information is available from staff who are frequently onsite and who document compliance with trail rules and incidents of trespass.
4. Compare recreation activities: Types of permitted human recreation activities often vary among parks and open spaces, and these different activities may have variable effects on target wildlife species. Relatively few studies to date have directly compared the effects of different activities at the same time, in the same place, and on the same target species (e.g., Taylor and Knight 2003). While this is a reasonable approach to parsing effects from different activities, it is probably not applicable or valuable in relation to studying public use impacts at Dana Point. The types of activities allowed are well defined and have a relatively

narrow range (i.e., no bicycles, horses or other recreation conveyances are allowed nor are dogs). Further, within the range of allowed uses, these could not be reasonably divided for an experimental purpose (e.g., only walking allowed on some days, only running on another, etc.). This recommended element for studying public use of preserves/parks and impacts on the public is more applicable to large recreational areas with various kinds of allowed recreation, and the ability to compare different uses. Further, such a study would have questionable application because if there were demonstrated differences in impacts from these recreational activities, it would not likely be enforceable to selectively prohibit those (e.g., no running only walking; or no walking only running).

5. Include reference conditions: It is important to include a reference condition or treatment in a study design to establish a baseline to detect potential effects of human recreation activity. For a study of the effects of recreation in general, a reference condition would be protected lands with no public access. For a study of the effects of dog management policy, a reference condition would be protected lands that do not permit dogs (Dertien et al. 2018). In the case of Dana Point, there are no off-site reference conditions due to the limited extant range of PPM and the different conditions at Camp Pendleton. Further, baseline conditions are limited to the data that were collected prior to the initiation of public use of the trail.

In summary, it is infeasible to design a study that would not impact and further endanger PPM, would control for all other variables, and would allow the detection of a direct cause-effect relationship between public use and impacts on PPM. However, specific types of monitoring and data collection can be informative towards detecting patterns and trends and these are largely already in place (see Section 5.3). Conducting such monitoring over a long period of time is essential towards providing an opportunity to account for other co-variates including weather and vegetation management, and other potential stressors.

4. Discussion on public use and impacts

At the population level, the Dana Point PPM population has been managed since 2005 to minimize the risk of extirpation. The Preserve is managed by dedicated and professional preserve management staff with input from scientists who are conducting research on this species as well as regulatory personnel for guidance in risk management. With such information and guidance, and using available financial resources (primarily the endowment established for the Preserve in 2005, and including the recent additional resources resulting from the agreement with Camp Pendleton), CNLM staff have focused on managing the vegetation for best effect, monitoring vegetative response and wildlife (PPM and gnatcatcher; other species informally), and managing public access.

For much of the period from 2009—when the trail on the Preserve was first opened to the public—until the COVID-related closure in 2020, the trail generally was open to the public seven days per week, 7:00 a.m. to sunset. However, there was no underlying research or principles that supported this amount of public access in relation to the need to protect the sensitive onsite natural resources. Indeed, if the only goal pertaining to the Preserve was to protect the Pacific pocket mouse, the most protective strategy would be to prohibit public access. The Preserve is an exceedingly small area of habitat, only 29 acres, and is surrounded by development that destroyed much of the original similar habitat.

As described above, natural resource impacts from public access may include trampling the burrows of Pacific pocket mouse; damaging plants that serve as food sources, nesting locations, shelter, and protection for wildlife; harassment of wildlife including impacts on reproduction; and interference with wildlife foraging, nesting, and predator avoidance. Although some prohibited activities can be reduced by constant monitoring, it is not feasible to completely eliminate such behaviors or the impacts of allowed public access, without limiting the amount and timing of public access.

In addition to public access to the trail, there are a number of other potential human impacts on the Preserve that cannot be avoided. These uses include first responders, management and monitoring by CNLM, and, to some extent, research activities on the resident species and habitat. This recognition of all human uses—including those that are and are not allowed—is significant because the potential for impacts from all of those uses are cumulative, and potentially additive and interactive.

As described above in Section 3.2, public use of the Preserve has been increasing every year, as reflected in trail use counter data. Average per-day use doubled over a seven-year period (2011-2017) and data from early 2020 indicated that these rates were continuing to increase. Further, plans for a hotel adjacent to the Preserve could result in additional visitation, and associated impacts related to development (e.g., the use of rodenticide, artificial lighting, noise, vibration, and disease/virus transmission).

Impacts from public visitation are also related to the time of year and time of day of public use. Public presence on site during low-light conditions (early morning and late afternoon) have the potential for greater impacts because, as discussed above, PPM are nocturnal and tend to be more active at night and during periods of low light. Certain times of year (for example, corresponding with reproductive activity of certain species), may also be indicative of the potential for greater impact from the visiting public.

The trail use data in 2021-2023 provide some insight into average daily use during periods where different hours and days of operation are used. The data indicate that a reduction in number of days per week and hours per day that the trail is open to the public resulted in a decrease in average daily visitors onsite, as compared to a schedule of seven days per week, 7 a.m. to sunset. CNLM would expect this type of schedule to similarly result in a decrease in the average weekly and annual number of visitors, as compared to a schedule of seven days per week, 7 a.m. to sunset. Although those data indicate that potential visitors do not simply funnel into a shorter time period if the trail is open fewer hours than seven days per week, 7 a.m. to sunset, the average daily visitation rates during a three days per week schedule of eight hours per day remain higher than the average per-day visitation rates in 2011. While a schedule of public access for three days per week, eight hours per day—has been shown to reduce number of visitors and thus likely impact, data also show that reduced access during those days and hours still allows public use of the trail at a rate similar to or greater than that in 2009 when the trail was first opened to the public.

In considering appropriate means of reducing the impacts from public use of the Preserve, the potential for habituation of wildlife species was researched and considered (i.e., whether a regular and daily schedule of public use would cause fewer impacts to the species than some daily closures). The scientific literature is far from comprehensive on this topic and none of it is based specifically on gnatcatcher or Pacific pocket mouse. However, in both theory and in the case studies that were reviewed, there is little evidence to suggest that there would be habituation to public presence, or that the habituation, if attained, would not cause impacts to the species. Regarding the latter, habituation would not likely cancel the public effect, but, at most, reduce it. Further, habituation could be maladaptive. But most importantly, there is no reason to assume that the public presence is perceived as "one stimulus" to which any species could become habituated. The public presence is a constellation of stimuli—sights, sounds, smells, vibrations, and movements—that change over the course of the day and between days. Further, there is evidence that males and females may habituate differently, if at all. Together, there was no indication that habituation was likely or would be beneficial. As such, the value of relief from such stimuli by designating some days as having no public hours for visitation, remained as a consideration with much merit. Furthermore, this approach would allow for more influence on the degree of public visitation than could be afforded simply by reducing the number of hours per day.

In summary, information on increasing use of the Preserve by the public, combined with the increasing evidence of negative impacts from human use on the natural resources including the listed species onsite, as well as the extreme vulnerability of the Pacific pocket mouse, strongly indicate a need for adaptive management that minimizes the impact of public access on the species on the Preserve. For nature preserves with public access, there are limited options for adaptive management to address these impacts, namely:

- Controlling types of activities allowed (assuming some have the potential to cause more impacts to the species than others)
- Managing or changing the spatial footprint of recreational trails; and
- Controlling the number and schedule of visitors (Dertien et al. 2018)

At the Dana Point Preserve, the first option is already employed, and monitored as much as possible. The second option is not feasible as there is not a location for the trail within the Preserve that would have a lesser impact. The management tool that is most well-suited to address these challenges is to control the number and schedule of visitors to the Preserve, by adjusting the number of days and number of hours that the trail is open for public access.

5. Proposed public access, rationale, adaptive management, and alternatives

5.1 Proposed public access schedule

The purpose of the proposed public access schedule is to provide appropriate public access to the trail on the Dana Point Preserve while protecting the rare and sensitive (and, in the case of two species, endangered or threatened) species on the Preserve. It is acknowledged that these two objectives are conflicting (e.g., Anderson et al. 2023). As such, the proposed public access schedule and related activities are intended to provide a reasonable compromise informed by scientific studies and current species and site conditions, and that takes into consideration the trajectory of increasing public use of the trail and additional threats to the species. As USFWS and CDFW noted in comments on an earlier version of a similar plan, “[it is critical] to conserve the remaining genetic variation within the Dana Point population by maximizing the size of this population”, which likely requires limitations on the amount and intensity of public access to the Preserve.

Based on the scientific literature, CNLM's experience and expertise, as well as discussions with interested parties (e.g., Wildlife Agencies, California Coastal Commission, the City of Dana Point, visiting public and researchers), the proposed public access schedule is as follows:

- Days of the week the trail will be open:

  Tuesday, Thursday, Saturday, and Sunday

- The hours the trail will be open will reflect general daylight conditions and be adjusted for two seasons: summer and winter.

  Summer hours: 8:00 a.m. to 6:00 p.m. Memorial Day weekend (the last Monday of May) to Labor Day weekend (the first Monday of September)

  Winter hours: 8:00 a.m. to 4:00 p.m. (the first Tuesday of September to the Friday of Memorial Day weekend)

- Hours of public access commence at the time indicated (8:00 a.m.) with the gates being open at that time. Public access ends (i.e., the public should be off the Preserve) at the time indicated, by season (i.e., 4:00 p.m. or 6:00 p.m.).

<u>Exceptions and variation on proposed schedule</u>:

- Dedication of public hours for special uses: Two afternoons (the first and third Tuesday) per month, will be reserved for special uses that serve the purposes of environmental justice, focused educational events, research, or other public interest as overseen by CNLM staff. The trail may be closed to other members of the public for these events.

- Necessary closures: For weather events that affect trail condition and sensitivity, wildlife emergency closures (e.g., nests or PPM burrow(s) adjacent to trail or overlooks), emergency personnel access (e.g., rescue or recovery events, fire threats, health concerns, etc.) and occasional management requirements (e.g., fence and trail repairs or installation, vegetation or habitat enhancement or maintenance, etc.). Following guidance from CNLM's past practices, the trail may be closed for up to 72 hours following rain events for public safety and trail sustainability, which has been the status quo for CNLM's management of the trail since the trail was initially opened to controlled public access in 2009. Management and maintenance activities (e.g., habitat maintenance, fence and trail repairs) also dictate the need for temporary trail closures (e.g., hours or days) as required to maintain public safety, the long-term sustainability of the trail, and the protection of the Preserve—which in turn will maintain or increase the public enjoyment of the trail. When possible, prior notification of closures will be posted for the public onsite and on CNLM's website.

5.2 Considerations and rationale

1. Control of amount and timing of public access and related impacts: Controlling public access based on a schedule of four days per week should allow some moderation and overall reduction in visitation (acknowledging that four days will increase annual visitation compared to visitation rates from 2021-2022). This is supported, at least in part, by the public visitation levels under the schedule of three days per week that was in effect from June 2021 to November 2022, which suggested that controlling the number of days and hours of access may result in reduced public visitation.

   Further information towards appropriately controlling public access on the Preserve was sought from a query of public access to other preserves and parks in southern California. A number of publicly accessible conserved lands in Southern California only allow controlled public access through a reservation system (e.g., Arroyo Hondo Preserve, Bolsa Chica Ecological Reserve, Seal Beach National Wildlife Refuge, Carpinteria Salt Marsh Reserve), scheduled volunteer and educational events (e.g., Starr Ranch Sanctuary, Irvine Ranch Open Space), or docent-led hikes (e.g., Ballona Wetlands Ecological Reserve, Jack and Laura Dangermond Preserve, Wren's View Preserve, and Trabuco Rose Preserve). Examples of how public access to these protected lands may be prohibited due to temporal or seasonal risk to public safety or temporary, seasonal, or situational risk to the sensitive biological species, are found throughout the state and within the Coastal Zone. Various recreational opportunities, such as hiking trails and campgrounds, may be closed temporarily or seasonally to protect the integrity of the public facilities (e.g., Palos Verdes Nature Preserve) or reduce the risk of exposing the public to unsafe trail conditions (e.g., Laguna Coast Wilderness Park, Aliso and Wood Canyons Wilderness Park), hazardous weather or environmental exposure (e.g., Malibu Creek State Park, Hollister Ranch Preserve, Huntington Beach, Cabrillo State Beach), or wildfire (e.g., Tumey Hills, Cleveland National Forest). As of February 2023, 16 of the reviewed protected lands have implemented partial or complete closure of publicly accessible trails and campgrounds due to the impacts of the January 2023 storms and are expected to remain closed until maintenance activities are completed. Many conserved lands, such as the Laguna Coast Wilderness Park restrict public access "when necessary to minimize impacts to sensitive habitat, to prevent user conflicts with wildlife" (Laguna Coast Wilderness Park Resource Management Plan, 1998). Cleveland National Forest and Pinnacles National Park implement seasonal restrictions on recreational activities on cliffs that support sensitive nesting raptors. Multiple conserved lands managed by the City of Malibu and the Palos Verdes Peninsula Land Conservancy temporarily close portions of public hiking trails to minimize impacts to nesting birds, such as the federally endangered California least tern (*Sterna antillarum browni*) or the coastal California gnatcatcher. Orange County Parks close sections of their trails during the riparian bird (i.e., to protect the federally and state-listed least Bell's vireo) breeding season (March 15-September 15) per Orange County Ord Sec 2-5-46(a) that allows the County to close recreational areas in the interest of protecting public convenience, public safety, or for protection of natural and cultural resources. Similarly, officials of the City of Lake Elsinore and Riverside County announced on February 2, 2023 that Walker

Canyon will be closed to public access for the duration of the 2023 wildflower bloom season to protect the habitat from environmental damage as seen in 2019 when tens of thousands of visitors arrived to view the “super bloom”. Instead of opening Walker Canyon to visitors, the County of Riverside has installed a live-stream camera to allow the public to view the 2023 bloom (http://www.lake-elsinore.org/Home/Components/News/News/3754/26).

Other means of controlling public access were considered for the Dana Point Preserve trail, including restriction of access during critical breeding seasons, limiting the density of visitors on site, and limiting the total number of daily visitors. The first consideration of biologically sensitive seasonal closures, while meaningful and most likely to be best connected with reduction of impacts, was ultimately abandoned as being unacceptable given the large amount of time per year that would necessitate trail closures. Given that PPM could be active above ground much of the year and coastal California gnatcatchers nest February through September, a public access schedule based on species sensitivity would result in closure much of the year.

Limiting the number of visitors or density control by only allowing access through docent/volunteer led hikes or a reservation system (as implemented on OCTA Preserves and the Irvine Ranch Conservancy, for example) was also considered impractical and unacceptable.

Another means of reducing and controlling public access is through imposition of access fees (e.g., day use fees at most County and State parks). However, fees can be exclusionary and would likely make the trail inaccessible to some communities, thus was not further considered as a public visitation control method for the Dana Point Preserve.

2. Days of week: Reflecting observed visitor use and visitor preferences expressed to staff (K. Merrill pers. comm.), data obtained from an informal survey of preferred days and times of trail use (unpublished CNLM data), and input from

California Coastal Commission staff, weekend days were included in the public access schedule. Also considered was overlap with the City's Nature Interpretive Center public hours, currently closed on Mondays and some holidays (K. Merrill pers. comm., website queried 2/23/2023 https://www.danapoint.org/department/general-services/parks/natural-resources/dana-point-headlands-conservation-area/nature-interpretive-center).

3. Hours per day: The proposed hours per day were determined to avoid low-light times of day when PPM is most sensitive and may be above ground or in a more alert state underground (see Section 3.6.2). Also considered was the importance of consistent public hours rather than varying from day to day based on cloud cover or sunrise or sunset conditions. Determination of public access based on those constantly changing hours have been noted to cause confusion and frustration in the visiting public, as well as constant public management and posting of information by Preserve staff. In addition, data collected by staff show increasing incidents of trespass after sunset (Figure 5). This is a crucial time when the public should not be on the Preserve, including the trail, to avoid harassment or harm to PPM that are active above ground at that time (see Section 3.6.2). The most effective way to control public access and prevent trespass after sunset has been to move the closing time further from sunset.

4. Seasonal differences (winter and summer hours): As a compromise between constant daily hours throughout the year, affording maximum predictability for the visiting public, as well as allowing longer visitation hours when daylight hours were longer, CNLM is proposing two seasons with different public access hours: summer and winter. The dates (coincident with Memorial Day and Labor Day) were selected as these are commonly considered the unofficial start and end dates of summer and winter in state, regional, and local parks and thus may be more familiar for the public. Many public parks similarly employ different hours of opening during different seasons.

Seasonal hours were informed by actual sunrise and sunset conditions for Dana Point (timeanddate.com). In summer, the latest sunrise time is approximately 6:27 a.m. and the earliest sunset time is at approximately 7:10 p.m. In winter, the latest sunrise time is approximately 7:13 a.m. and earliest sunset time is approximately 4:42 p.m. Those statistics represent the longest periods of daylight during those two seasons. Some buffer between these times is important to avoid, as much as possible, low-light periods. During the winter schedule—which is the greater part of the year (approximately eight months)—this only provides a buffer of approximately 45 minutes for some days.

5. Alternate public access locations nearby: Given that there is no direct access to the water or the beach from CNLM's Dana Point Preserve trail, the proposed access schedule will not impact the ability of the public to access the water or the beach. Additionally, trail users are still able to use an interconnecting network of City trails during the times that the Preserve trail is closed. The Preserve trail provides coastal views, which can also be enjoyed by the public from other locations within City parks that do not sustain sensitive populations of endangered and threatened species. When the Preserve trail is closed, the public can experience such coastal outlooks at the adjacent Hilltop, Harbor Point, and Strands Conservation Parks, especially for sunset as seen at the City's Harbor Point (Figure 11). Further, there is no direct access from the network of City trails to the ocean/beach east of the Dana Point Preserve, regardless of whether the Dana Point Preserve trail is open. Rather, the public can use the City's pedestrian/bicycle trail to either connect with trails that lead to the beach or with trails that lead to the street that can then be followed to the beach. The closure at certain times of the Dana Point Preserve Trail does not affect the public's ability to get access to the coast or beach nor does it disrupt connectivity to the city-owned trails at Strands, Hilltop or Harbor Point or to the Dana Point Harbor (Figure 12). To access CNLM's coastline (a pebble beach at the bottom of the Preserve's cliffs), the public may do so at low tide, entering from the north

at Strands Beach or from the south via the Ocean Institute. There is never access to this pebble beach from the trail at the Preserve.

According to the City of Dana Point's website, the City has over 28 parks within city limits for recreation, coastal access, exercise, and nature appreciation. Most of these parks have trails and/or coastal views including, but not limited to, Bluff Top (near the Dana Point Preserve), Hilltop, Harbor Point, Chloe Luke Overlook, Crystal Cove Park ("Ocean Knoll"), and Dana Point Harbor (Table 7).

Table 7. Public open space and trail access opportunities within the City of Dana Point.

Open Space Name	Ownership/ Land Manager	Size (acres)	Trail Length (miles)	Coastal View
Bluff Top Trail	City of Dana Point		0.2	Yes
Chloe Luke Overlook	City of Dana Point	0.4	n/a	Yes
Crystal Cove Park (aka Ocean Knoll)	City of Dana Point	1.6	n/a	Yes
Dana Cove Park	Orange County	5.4	n/a	Yes
Dana Point Harbor Park	Orange County	5.9	2	Yes
Doheny State Beach	California Department of Parks and Recreation	76	7	Yes
Harbor Point	City of Dana Point	9.3	0.3	Yes
Hilltop	City of Dana Point	11.7	0.7	Yes
Heritage	City of Dana Point	16.1	1	Yes
Lantern Bay	Orange County	15	1	Yes
Louise Leydon	City of Dana Point	0.5	n/a	Yes
Palisades Gazebo Park	City of Dana Point	0.7	n/a	Yes
Pines Park	City of Dana Point	4.7	n/a	Yes
Salt Creek Beach County Park	Orange County	45	1.2	Yes
Sea Terrace Park	City of Dana Point	27	Connector trail	No
Sea View Park	City of Dana Point	0.47	0.4	Yes
Strand Vista Park (South Strands Park)	City of Dana Point	16	1.2	Yes
Sycamore Creek Trail	City of Dana Point	n/a	0.5	No
Total		**236**	**16**	

Figure 11. View from Harbor Point Conservation Park. Photo taken by CNLM Ranger James Ligoretti, 2022.

Expanding outside of the city limits, in Orange County, within 10 miles of the Dana Point Preserve, there are at least 42 other open spaces located in the California Coastal Zone that provide over 20,000 acres of public access with hiking and recreational opportunities along an estimated 174 miles of trails, boast scenic ocean views, and/or provide beach access, including the Marblehead ("Sea Summit") Preserve in San Clemente, managed by CNLM (Appendix B). Approximately 3 miles east of the Dana Point Preserve, Doheny State Beach transitions into the Capistrano Beach Park, a 55-acre public beach with over 4 miles of beach trails. Approximately 3 miles northwest of the Preserve lies Aliso Creek County Beach, a 64-acre beach that provides multiple amenities, such as a playground, parking lot, and opportunities for recreational water sports, in addition to beach access, scenic views, and tidepools. One mile inland, the Aliso and Wood Canyons Wilderness Park, a 4,500-acre park, provides multiple opportunities for recreational activities and exposure to native coastal habitat, through its 50 miles of multi-use trails, scenic views of the ocean, picnic areas, and visitor center. All of these Orange County locations provide immense opportunities for varied recreational activities, outreach and education opportunities, exposure to native coastal habitats, or beach access.

6. Special events: Special events offer a valuable opportunity to provide access to a variety of groups, and community organizations but also may cause a congregation of individuals and increase visitation—either of which could result in concerning conditions for the natural resources onsite or decrease the Preserve experience for individual visitors. As such, CNLM proposes to use a modest amount of public access hours dedicated to special events such as educational tours on the first and third Tuesday of each month from 12:00 p.m. to 4:00 p.m. (see Section 5.1, Proposed public access schedule). On these days and times the trail will be closed to general public access but open to group tours. Individuals and groups will be able to sign up for tours in advance by contacting CNLM staff. If no groups or individuals have signed up for a tour, the trail will revert to being open to the general public access. These tours will be led by CNLM staff or CNLM volunteers and will be education-focused (see Section 5.3.9). Large, organized groups will be prohibited on the trail outside of these hours as the impact on public access would be substantial.

Figure 12. Dana Point Trail Map from the City of Dana Point. (Downloaded from City's Natural Resources website, 13 February 2023. https://www.danapoint.org/department/general-services/parks/natural-resources/dana-point-headlands-conservation-area/trail-system.

5.3 Adaptive management of public access

Information presented in this 2023 Plan represents relevant data, experience, and scientific knowledge to date. To continue to ensure that the most appropriate balance is achieved between controlled public access of the Preserve and protection of the sensitive natural resources onsite, there will be ongoing collection of data, review of scientific literature, and acquisition of experience, with well-considered application to the management of the Preserve.

5.3.1. *Monitoring of amount of public access*

To monitor public visitation, infrared pedestrian trail counters placed near both the Scenic and Selva gates will be maintained (batteries replaced, wire connections secured, corroded parts replaced, etc.), and data collected and analyzed (using the online TRAFx portal, trafx.net, or a CNLM created database) on a quarterly schedule if not monthly. Placement and location of the trail counters will need to be revisited annually to improve utility and the quality of data collected. Staff and volunteers will note in weekly reports unusual or extreme visitation during their patrol shifts, biological monitoring, and management tasks. From this, average daily visitation rates and annual visitation rates can be interpreted and inform management.

5.3.2. *Monitoring of public behavior*

Similar to monitoring the amount of public access, monitoring public visitation behavior (compliance, incidents, impacts, resources used) will take a multi-faceted approach: CNLM staff will continue to use trail counters, trail cameras, and on-the-ground observations to report (e.g., dogs or other pets on the trail), document, and analyze visitation behavior. CNLM staff will continue to be onsite to patrol the trail and provide educational material to the visiting public, enforce trail rules, and report onsite conditions. This information will influence CNLM's updates to signage, rules, education material, and management.

5.3.3. *Monitoring of habitat quality*

As a potential correlate to gnatcatcher and PPM population size, CNLM will continue to monitor the vegetative cover (composition and spatial distribution) of the Preserve (excluding the cliff areas). Since 2006, monitoring of the coastal sage scrub has been conducted using twenty permanent point-intercept line transects. Each year a subset of five of these twenty transects are monitored on a rotating schedule so all twenty are monitored in a four-year period. More PPM-focused habitat suitability monitoring, similar to those conducted in 2020 and 2022 (Brehme et al. 2020, CNLM 2022, 2023), will be conducted every 3-5 years or sooner if a shorter interval is required (e.g., after a fire event, or extreme drought conditions) and as resources allow. Adjustments or changes to the habitat monitoring schedule or protocol will be evaluated and implemented as new information is learned through CNLM's experience and staff recommendations, collaboration with other researchers (e.g., USGS, SDZWA and wildlife agencies), scientific literature and advances in conservation technologies (i.e., remote sensing technologies).

5.3.4. *Monitoring of Pacific pocket mouse site use (i.e., area occupied)*

Since 2011, CNLM has used track tubes to monitor PPM using methods developed by experts in the field and following USFWS survey protocols. Track-tube monitoring will continue to be conducted annually to provide information on presence/absence, area occupied, and habitat suitability of PPM on the Dana Point Preserve. As previously practiced, CNLM will attempt to coordinate annual monitoring activities with the City of Dana Point to monitor their Hilltop Park adjacent to the Preserve to maximize the data collected and minimize sampling bias.

5.3.5. *Intermittent direct detection of Pacific pocket mouse (live-trapping)*

Live trapping of PPM will continue to be used to supplement track-tube monitoring to provide additional estimates of population size, as well as phenological and demographic data. This type of monitoring carries risks to both PPM as well as non-target wildlife and, as such, is used less frequently than track-tube monitoring. During live-trapping other information can be gathered from supplemental collection/research such as dietary preferences through fecal analysis of collected scat or genetic information through ear-snip collections to name a few. CNLM historically has conducted live trapping every 3-5 years or soon as warranted (e.g., such as in 2019 when limited trapping was conducted to determine the status of PPM reproductive activity, CNLM 2020) and will likely maintain this schedule in the future.

5.3.6. *In situ research*

The limitations on direct research onsite regarding public access effects have been previously described. Factors inherent to the biology and status of the species as well as the Preserve context and lack of temporal (i.e., "before public visitation") and spatial (reference sites) experimental controls, are some of the limitations. The onsite research that can be conducted is that of long-term monitoring of PPM, gnatcatcher, and certain other site conditions (e.g., vegetation). Although those monitoring results would reflect a composite of all influences, data collected over the long-term may provide patterns that can be interpreted for management purposes. Over time, improvements in the technology for remote sensing and monitoring may provide more intimate insights into PPM status and behavior and allow more direct linkages with other factors.

5.3.7. *Ex situ research*

The growing body of scientific research on public-wildlife interactions, particularly with small nocturnal mammals and birds, will continue to provide information towards understanding the interactions between PPM (and gnatcatchers) and the visiting public and, as such, how to better avoid and minimize any negative impacts. Some research being conducted with captive bred mice on stress-mediated relationships between PPM and certain stimuli could also provide more direct information (D. Shier pers. comm.). However, captive bred mice may also have different or decreased stress response because of exposure to more domesticated conditions and exposure to humans. As such, extrapolation from any studies with captive-bred mice would require careful consideration.

5.3.8. *Summary of information*

Adaptive management requires not only the collection of data (or other representations of conditions and experience) over time, but inspection, analysis, interpretation, and application. It is anticipated that there will be an annual review of this information to determine the general status of PPM on the Preserve, amount and nature of public visitation, and status of other elements of PPM habitat. Relevant scientific literature will be queried to refresh our awareness. Although this information will be assessed for management implications, it is acknowledged that there is some tension between the value or need to change public access hours (increasing or decreasing) and the interest in collecting information. Frequent adjustments in public access schedule have the consequence of reducing the ability to see patterns on public use impacts (or lack of)

PPM over time–that is, it reduces the general experimental frame to detect correlations or other patterns. Further, frequent changes (or changes in direction) in the public access schedule can cause confusion and frustration by the public as well as lessen compliance, leading to drain on staff resources and increased incidence of trespass and potential impacts.

5.3.9. *Outreach and education*

As a current practice that CNLM plans to continue to the extent supported with financial and staff resources, CNLM enhances visitor experience with information provided directly by staff and indirectly with other media. To the extent feasible CNLM will refresh educational signs and interpretive panels, brochures, and website info, provide guided public tours, and increase public awareness of conservation issues through providing more detailed information to the public regarding literature and the science behind it related to public impacts on natural resources. Focus will be to enhance CNLM's current outreach activities through grants and other funding sources. To extend capacity to provide such enhanced experience, CNLM will apply for grants or otherwise seek opportunities to: (1) update existing Dana Point Preserve outreach materials (including signs, pamphlets, and other media) to be more accessible by those for whom English is not the first language (i.e., translations) and underrepresented members of the visiting public and (2) design and develop workshops based on coastal conservation, pollution, climate change, and best stewardship practices using CNLM's Dana Point Preserve for context. If feasible, workshops are expected to foster discussion, utilize multiple educational tools, and provide interactive activities (e.g., onsite and offsite opportunities for public engagement). In addition, CNLM will continue to develop partnerships with outreach and education organizations to increase public outreach across multiple platforms and engage further with underrepresented communities.

If resources become available, CNLM plans to install a camera on the Preserve that would allow live-streaming views of the Preserve (similar to what has been implemented in Walker Canyon, see section above), accessible through the CNLM website. The camera would serve the dual purpose of research, in addition to outreach, providing additional data on activity and use at the Preserve. This visual (and potentially auditory) platform would provide the public with an additional type of access for a much longer period than direct visitation hours and be available for a more geographically distant public, as well as those with limited mobility who may not be able to access the Preserve trail.

5.3.10. *Other potential use and partner relationships*

CNLM plans to continue to maintain relationships with CDFW's Enforcement branch (i.e., Game Wardens), Orange County Sheriff's Department, and Orange County Fire Authority regarding protection of the Preserve, emergency use, and training. In addition, CNLM will maintain and revise the protocol for any proposed research needing access to the Preserve, including review of research proposals for risks, conservation value, and opportunity to conduct research elsewhere.

5.3.11. *Consistency with the Coastal Act, CDP No. 04-23 and the HDCP*

The adaptive management activities, including the hours of operation for the trail, proposed in this 2023 Plan are consistent with Master CDP No. 04-23 and the HDCP, which, along with the Coastal Act, require a balance between public access and protection of natural resources. As noted in Section 5.1 of the HDCP, "[t]he primary purposes of the Coastal Act are to protect, maintain, and, where feasible, enhance and restore the natural and scenic qualities of the coastal zone resources; assure an orderly and balanced use and conservation of coastal zone resources; maximize public access consistent with conservation principles and constitutionally protected private property rights; assure priority for coastal-dependent and coastal-related development; and encourage state and local cooperation concerning planning and development." This Plan proposes to apply conservation principles to ensure that public access is consistent with protection and maintenance of the natural qualities of the coastal zone resources.

The Coastal Act requires maximum access, "consistent with . . . the need to protect . . . natural resource areas from overuse" (CA Public Resources Code section 30210). The Coastal Act specifically contemplates that public access may not be unlimited, and requires that public access policies be implemented in a way that "takes into account the need to regulate the time, place, and manner of public access" depending on a number of factors, including "[t]he capacity of the site to sustain use and at what level of intensity. . . and the fragility of the natural resources in the area. . . ." (CA Public Resources Code section 30214). As noted in Section 3.2 above, the intensity of use of the trail on the Preserve has increased dramatically since the trail was planned and first opened to the public in 2009, and the fragility of the natural resources has become more apparent. The HDCP implements these Coastal Act provisions through its policy to "[r]egulate the time, manner and location of public access to parks and open space containing sensitive biological resources to maintain and protect those sensitive resources . . . while honoring the public's constitutional right of access to navigable waters." (HDCP Policy 5.20). Additionally, HDCP Policy 3.11 limits uses within the Preserve to "passive public recreational facilities such as trails, benches, and associated safety fencing and interpretive/directional signage provided those uses do not significantly disrupt habitat values." Similarly, the City's Municipal Code sections regarding lateral public access and bluff top public access require that "in some cases controls on the time, place and manner of uses may be justified by site characteristics including sensitive habitat values. . . ." (DMPC section 9.27.030(a)(4)(A)(1), (C)(1) and (D)).

The Conservation Easement for the Preserve fulfills Condition No. 36 of CDP No. 04-23, which requires dedication of a conservation easement to preserve environmentally sensitive habitat areas (ESHA). The Conservation Easement implements the intent of the City and CNLM "that the natural habitat, aesthetic, landform, ecological and educational values of the [Preserve] be further protected in perpetuity against any activities that would detrimentally harm the habitats, sensitive species and natural landforms on the Property." The Conservation Easement itself does not describe the appropriate level of public access to the trail, except to say that such access shall be "controlled" and "limited to the nature trail and overlook areas. . . ." (Conservation Easement, section 5.2(d)). The City and CNLM are required by the Conservation Easement to ensure that public access does not "materially impair or interfere with [the biological] values and resources" of the Preserve (Conservation Easement section 2.).

USFWS and CDFW are third party beneficiaries of the Conservation Easement and have the right to enforce it (Conservation Easement section 10.1.).

Given the small size of the Preserve, the increasing number of visitors on the Preserve trail, the unavoidable instances of trespass off trail and after sunset, and the sensitivity of the species at the Preserve, a conservative and adaptive management approach that takes into account the abundance of information now available on the impacts of passive recreation is needed. A reduction in the number of hours that the trail is open to the public should lead to a decrease in the number of people on the trail, which should result in decreased impact on the species and habitat. Although such reductions and impacts may be difficult to quantify precisely with currently available information, the obligations under the entitlements for the Headlands development project and the NCCP/HCP, as well as the Conservation Easement for the Preserve, require limitations on public access to minimize further adverse effects on the species and habitat.

The proposed hours for operation of the trail and for associated adaptive management activities are consistent with the public access program and the conservation program of the HDCP (see, e.g., Table 4.5.1). The trail will remain in place and open to public access for controlled access and periods of time intended to limit impact on the sensitive species. It shall continue to remain accessible to the public year-round, unless USFWS and CDFW determine that it should be closed for a specific period to protect on site resources. CNLM, the non-profit organization that owns and manages the Preserve, is determining hours of daily operation through the proposals in this Plan. The view overlooks will continue to provide signage, educational material, and other relevant information that is accessible to the public when the trail is open, during times of least impact to the species. Public access to areas outside of the trail and overlooks shall continue to be prohibited and pets will continue to be prohibited in the Preserve. CNLM will continue its efforts to ensure that visitors adhere to these prohibitions.

This Plan also conforms to the Design Concept outlined in the HDCP (See Section 4.4.B.1). The Preserve is and will remain an area “to permanently preserve the significant landform, and conserve, manage, and preserve the existing flora and fauna. The [Preserve] shall consist of natural open space and be dedicated to the conservation and enhancement of the existing habitat." The proposed hours of public access and associated adaptive management activities will contribute to the conservation, preservation, and enhancement of the Preserve's natural resources. This Plan is one component of the "long-term management programs for the study and maintenance of the natural resources," as required by the HDCP, and serves to "[d]efine an appropriate level of public access along" the trail, as specifically described in the Design Concept for the Preserve (HDCP Section 4.4.B.1). When the trail is open to visitors, it will serve as a throughway connection between trails owned and managed by the City in the Headlands area, as well as other parts of the City of Dana Point. When the trail is closed, recreational users will still be able to access and use the Headlands trails owned and managed by the City. Direct access of recreational users to the beaches and water will not be affected by the Preserve's trail access schedule since the trail on the Preserve does not provide access to the beaches or the water.

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Appendix A. Summary of literature pertaining to biological impacts of recreational and anthropogenic disturbances.

Author	Taxa or Species	Location	Objectives	Result
Allen et al. 2021	Song sparrows (*Melospiza melo-dia*)	British Columbia, Canada	Experimentally manipulated fear in wild songbird populations over 3 breeding seasons by broadcasting playbacks of either predator or nonpredator vocalizations, quantified effects on components of population growth.	Fear (stimulated by predator call playback) significantly reduced population growth rate through cumulative, compounding adverse effects on fecundity and offspring survival. Parents exposed to predator playback produced 53% fewer recruits to adult breeding population. “Fear” itself was projected to halve the population size in 5 years.
Anderson et al. 2023	Mammals	Glacier National Park, MT, USA	Used a COVID-19 closure within a heavily visited national park to examine how “low-impact” recreational hiking affects the spatiotemporal ecology of a diverse mammal community.	Camera trap data from park closure period and subsequently re-opening to recreation showed consistent negative responses to human recreation across most of assemblage of 24 species, with fewer detections, reduced site use, and decreased daytime activity after re-opening.
Anze and Koper 2018	Savannah sparrows (*Passerculus sandwichensis*)	Alberta, Canada	Influence of anthropogenic noise (industrial Infrastructure) on anti-predator behavior.	Greatest impacts on behavior were detected at the noisiest treatment; feeding latency was shortened compared with control sites, which may expose nests to greater predation risk.
Arlettaz et al. 2007	Black grouse (*Tetrao tetrix*)	Switzerland	Evaluated the physiological stress response (corticosterone levels) after disturbance induced by snow sports.	Birds in disturbed habitat had significantly higher concentrations corticosterone metabolites than those in habitats with no/very limited human disturbance. Corticosterone did not differ between habitats with moderate vs. high human disturbance.
Baharudin et al. 2022	Small mammals	Malaysia	Surveyed non-volant small mammals in a forest preserve unit to inform conservation and management.	Species composition of non-volant small mammals was reduced in areas with greater anthropogenic activity (jogging, hiking and camping).
Banks and Bryant 2007	Birds, multiple species	Australia	Experimentally manipulated dog walking at woodland sites adjacent to urban areas and monitored response of multi-species bird assemblages.	Dog walking in woodlands led to a 35% reduction in bird diversity and 41% reduction in abundance, both in areas where dog walking is common and where dogs are prohibited.
Bar-Ziv et al. 2022	Spur-winged lapwing (*Vanellus spinosus*)	Israel	Investigated escape behaviors of lapwings in open space and human dominated habitats (HDH).	Lapwings in HDH were bolder in their predator-avoidance sequence (shorter FIDs, shorter distances fled, and a higher probability of escape by running vs. flying) towards both human and non-human threats; this suggest that HDH impose a broader behavioral change on lapwings, rather than just simple habituation.

Author	Taxa or Species	Location	Objectives	Result
Barber et al. 2010	Multiple species	Multiple	A review of impacts of chronic noise exposure studies on terrestrial organisms.	A broad range of findings that indicate the potential severity of this threat to diverse taxa, and recent studies that document substantial changes in foraging and anti-predator behavior, reproductive success, density, and community structure in response to noise.
Barcelos et al. 2021	Mammals	Cavernas do Peruaçu National Park, Brazil	Used camera traps to surveys trails before and after national park opened to tourists to investigate effects of trail use on mammal species richness, probability of using trails, activity levels, and daily activity patterns.	Overall, results show that the initial years of visitation at the park had limited negative impacts on the target mammal species, although some species were displaced or showed temporal adjustment.
Barros and Pickering 2017	Plant communities	Argentina	Impact of informal trails and off-rail use on plant communities in protected areas of high conservation value.	Vegetation in 90% of valley damaged by visitor use. Informal trails and trampling off-trail can cause landscape-scale damage.
Bateman and Fleming 2017	Multiple species	Multiple	Literature review to compare and contrast different measures of response to tourist activities (avoidance responses, time budgets, and physiological responses).	Most studies reviewed interpret data as negative impacts of tourist activities; this review finds that behavioral data (flight responses and time budgets) often indicated positive effects; time budget data are often ambiguous, while physiological data tended to show negative responses.
Beale and Monaghan 2005	Black-legged kittiwakes (*Rissa tridactyla*), common murres (*Uria aalge*)	Scotland	Examined the relationship between daily visitor numbers and daily failure rates of nests in two species of seabirds.	Daily failure rates for kittiwakes increased slightly on days with higher visitor numbers. For murres, failure rate declined seasonally but was not significantly correlated with visitor numbers.
Bejder et al. 2009	Multiple species	Multiple	Reviewed the conceptual framework for the use of habituation, sensitization, and tolerance, and provide a set of principles for their appropriate application in studies of behavioral responses to anthropogenic stimuli.	Describe how cases of presumed habituation or sensitization may actually represent differences in the tolerance levels of wildlife to anthropogenic activity.
Bennett et al. 2013	Karner blue butterfly (*Lycaeides melissa samuelis*)	Indiana, USA	Used field surveys and simulations to examine response of butterflies to recreation, including oviposition rate and host plant choice; tested management strategies to alleviate recreation impacts.	Butterflies were sensitive to recreational disturbance and flushed at similar speeds and distances from recreationists as they would from natural threats, such as predators. Simulation models indicated that regular disturbance could reduce egg laying potential and significantly restrict host plant choice.
Blair and Launer 1997	Multiple	California, USA	Butterfly diversity and human land use; Species assemblages along an urban gradient.	Species richness and diversity of butterflies peaked at moderately disturbed sites while relative abundance decreased from natural to urban areas.

Author	Taxa or Species	Location	Objectives	Result
Blickley et al. 2012	Greater Sage-Grouse (*Centrocercus urophasianus*)	Wyoming, USA	Experimentally tested effects of chronic noise from human activities on sage grouse at leks.	Peak male attendance (i.e., abundance) at leks experimentally treated with anthropogenic noise from natural gas drilling and roads decreased 29% and 73%, respectively. There was limited evidence for an effect on peak female attendance.
Bötsch et al. 2017	Forest-nesting birds, multiple species	France	Measured disturbance of walking trail activity on birds during territory establishment.	Number of territories and species richness in disturbed (recreational walkers) areas substantially reduced compared with control plots (no walkers). Species most affected were open-cup nesters and above-ground foragers.
Boyes et al. 2021	Moth caterpillars (Lepidoptera)	England	Evaluated the impacts of nighttime lighting on wild caterpillars.	Street lighting strongly reduced moth caterpillar abundance compared with unlit site, affected caterpillar development, and disrupted the feeding behavior of nocturnal caterpillars.
Cassirer et al. 1992	Elk (*Cervus elaphus*)	Montana and Wyoming, USA	Measured movements of habituated and unhabituated populations of elk when disturbed by cross-country skiers to assess energy costs and identify factors that might influence elk behavior.	Among habituated elk, “predictability” of disturbance influenced response. Unhabituated elk responded similarly to skiers and logging disturbance; flight distance was related to topographic features. Elk often returned to area following displacement. Estimated energy expenditure from displacement was 5.5% of total daily expenditure, increasing exponentially with snow depth.
Cushman and Meetenmeyer 2008	Forest pathogen (*Phytophthora ramorum*)	California, USA	Examined the influence of humans and a range of environmental factors on the distribution of *P. ramorum* at three distinct spatial scales (along hiking trails, open space with public access, and human population density).	*P. ramorum* more commonly occurred in soil on hiking trails used heavily by humans than in soil from adjacent areas off trails. Forests on public land open to recreation had higher prevalence of disease than forests on private lands. Probability of disease occurrence increased significantly with population density in the surrounding area.
Derryberry et al. 2020	White-crowned sparrow (*Zonotrichia leucophrys*)	California, USA	Compared soundscapes and songs before and during Covid-19 shutdown; evaluated whether a songbird exploited newly emptied acoustic space.	Noise levels in urban areas were substantially lower during the shutdown, characteristic of traffic in the mid-1950s. Birds responded by producing higher performance songs at lower amplitudes, effectively maximizing communication distance and salience.
Dertien et al. 2021	Multiple species	Multiple	Reviewed research on the effect of non-consumptive recreation on wildlife to identify effect thresholds or the point at which recreation begins to exhibit behavioral or physiological change to wildlife.	Threshold distances varied substantially within and amongst taxonomic groups. Threshold distances for wading and passerine birds were <100m, but >400m for hawks and eagles. Mammal threshold distances varied widely from 50m for small rodents to 1,000m for large ungulates.

Author	Taxa or Species	Location	Objectives	Result
Fernández-Juricic 2001	House sparrow (*Passer domesticus*), common blackbird (*Turdus merula*), common wood pigeon (*Columba palumbus*), Eurasian magpie (*Pica pica*)	Spain	Examined factors that influence alert distances to pedestrian approaches in five large wooded open space.	Habitat structure modified alert distances: bird tolerance increased with greater availability of escape cover. Alert distances varied among species, with large species being less tolerant of human disturbance than small ones.
Ficetola et al. 2007	Terrestrial vertebrates (small mammals, birds, reptiles, and amphibians)	Italy	Examined recreation disturbance (people presence, trampling) on distribution of animals in urban parks.	Disturbance and forest maturity influenced the distribution of some species and the species richness of amphibians and reptiles; however, the pattern was not consistent across species within taxa or among taxa.
Finney et al. 2005	Golden plover (*Pluvialis apricaria*)	United Kingdom	Impact of recreational disturbance (intensity and extent) on the distribution and reproductive success of plovers breeding in proximity to an intensively used trail.	Prior to trail resurfacing, when people strayed from the footpath, plovers avoided areas within 200m of the trail during chick-rearing. After trail resurfacing, >96% of walkers remained on-trail, and plovers avoided areas within only 50m of the footpath. No detectable impact of disturbance on reproductive performance.
Frid and Dill 2002	Multiple species	Multiple	A review of studies where predation and nonlethal disturbance stimuli are proposed to create similar trade-offs between avoiding perceived risk and fitness-enhancing activities (feeding, parental care, mating); provide theoretical framework for human-caused disturbance stimuli as a form of predation risk.	Most literature examples were consistent with predictions of the risk-disturbance hypothesis (human-caused disturbance stimuli as a form of predation risk).
George and Crooks 2006	Bobcat (*Lynx rufus*), coyote (*Canis latrans*), and mule deer (*Odocoileus hemionus*)	California, USA	Investigated the relationship between large mammal spatial and temporal activity patterns and human recreation in an urban nature reserve using camera trapping.	Bobcats, and to a lesser degree coyotes, exhibited both spatial and temporal displacement in response to human recreation. No effect was detected for mule deer.

Author	Taxa or Species	Location	Objectives	Result
Gill et al. 2001	Multiple	Multiple	The effect of human disturbance on animals is frequently measured in terms of changes in behavior in response to human presence and the magnitude of these changes in behavior is often used as a measure of the relative susceptibility of species to disturbance. This paper discusses whether such assessments are accurate measures of the relative susceptibility of species to human disturbance.	The authors suggest that the degree of avoidance/durance resulting from human presence may be a misleading measure of impact particularly when a species is constrained in its ability to avoid or relocate in response to disturbance.
Glover et al. 2011	Shorebirds, multiple species	Australia	Measured the distance at which a response (flight initiation distance [FID]) occurred among 28 shorebird species when presented with an approaching human.	FID differed by species; species with higher body masses had longer FIDs. Mean FIDs for species were 18.6–126m. FID was influenced by starting distance of human approach, flock size, previous exposure to humans, and stimulus type (walker, jogger, walker with dog).
Gomez-Serrano 2021	Kentish plover (*Charadrius alexandrines*)	Spain	Estimated the impact of human presence affects breeding birds.	Walkers, when accompanied by dogs flushed plovers 80-93% of the time, whereas pedestrians alone flushed plovers 13-47.6% of the time. Nest return times were shorter on disturbed beaches, suggesting habituation to the human disturbance.
Gutzwiller et al. 1994	Birds, multiple species	Wyoming, USA	Effects of human intrusion on song occurrence and singing consistency in subalpine birds.	Singing by several species was not influenced by intrusion. For some species, song occurrence and singing consistency were higher on controls than on intruded sites, indicating intrusion reduced singing activity.
Habib et al. 2007	Ovenbirds (*Seiurus aurocapillain*)	Alberta, Canada	Assessed pairing success and age distribution of birds in boreal forests around noise-generating compressor stations compared with areas around habitat-disturbed, but noiseless, wellpads.	Significant reduction in ovenbird pairing success at compressor sites compared with noiseless sites. Significantly more inexperienced birds breeding for the first time were found near noise-generating compressor stations than noiseless well pads.
Hennings 2016, 2017	Multiple species	Multiple	This document reviews the literature on overall and relative effects of three user groups – hikers, mountain bikers and equestrians – on trails, habitat, and wildlife to help inform ecologically appropriate placement and construction of trails in natural areas.	Trails and trail use can damage natural areas by negatively affecting soils, vegetation, water quality, plants, and animals. Human disturbance increases animals' stress and can cause them to hide, change behavior or flee. Some species, such as those that do well in urban areas, are generalists and can tolerate human disturbance. Other species such as pregnant animals, long-distance migrants, and habitat specialists tend to be more stressed and displaced by trail users. Some species may permanently leave a natural area.

Kamel 2020	Invertebrates	Egypt	Surveyed spatial variation of the diversity of gall-inducing insects at different distances from a hiking trail.	Species richness and abundance of gall-inducing insects were significantly positively correlated with the distance from the trail. In most species, the proportion of galled plants was significantly positively correlated with the distance from the hiking trail.
Kangas et al. 2010	Birds, multiple species	Finland	Examined effects of recreation on forest bird communities in protected areas. Bird data collected along hiking trails and in undisturbed control areas were related to number of visits, area of tourism infrastructure, and habitat variables.	Results indicate that number of visits affects occurrence and composition of bird communities, but not species richness. Open-cup nesters breeding on ground showed strongest negative response to visitor pressure, while open-cup nesters in trees/shrubs were more tolerant. No significant impact detected for cavity-nesting birds.
Larson et al. 2016	Multiple species	Global	Conducted a systematic review of the scientific literature and analyzed 274 articles on the effects of non-consumptive recreation on animals, across all geographic areas, taxonomic groups, and recreation activities. Quantified trends in publication rates and outlets, identified knowledge gaps, and assessed evidence for effects of recreation.	Over 93% of reviewed articles documented at least one effect of recreation on animals, the majority of which (59%) were classified as negative. Studies of amphibians, reptiles, and fish are lacking. Some taxonomic groups (e.g., raptors, shorebirds, ungulates, and corals) had greater evidence for an effect of recreation. Non-motorized activities had more evidence for a negative effect of recreation than motorized activities, with effects observed 1.2 times more frequently.
Larson et al. 2018	Multiple species and subspecies of conservation concern in southern Ca.	California, USA	Modeled visitation rates for regional preserves, exposure of sensitive species, factors driving visitation rates.	Accessibility (numbers of housing units and parking lots) had positive relationships with visitation rates. Orange-throated whiptail (*Aspidoscelis hyperythra*), western spadefoot (*Spea hammondii*), and coastal California gnatcatcher (*Polioptila californica californica*), are likely exposed to high levels of recreational activity.
Larson et al. 2019	Birds, mammals, reptiles	Global	Conducted a global meta-analysis of the effects of recreation on vertebrate richness and abundance. Included 34 articles.	Species richness and abundance were lower in association with higher levels of recreation. In approximately 7 of 10 comparisons, vertebrate richness or abundance is expected to be lower with higher levels of recreation.
Lei et al. 2022	Mammals	China	Assessed taxonomic, phylogenetic, and functional diversity for a mammal community in a protected area to examine how trail use and habitat variables affected sightings and signs of mammals.	More developed and heavily used trail types had greater adverse effect on all diversity richness indices than did less intensively used trail types. Consequently, tourist pressure was associated with a general tendency to homogenize the site's mammal community. The effects of trail types on diversity evenness indices were non-significant.

Liedtke et al. 2020	Native and non-native plants, multiple species	Chile	Evaluated the importance of hiking trails for plant invasion in protected mountain areas.	Hiking trails foster non-native species (NN) spread into mountains; NN at higher elevations are a subset of the lowland source pool and NN number and cover decreases with increasing elevation and distance to trails.
Lucas 2020 (*in* CDFW 2020)	Multiple species	Multiple locations	A literature review of recreation-related disturbances to wildlife; explores sustainability of dual-role preservation area (those used for conservation and recreation).	Evidence from literature indicates incompatibility between recreation and conservation goals of dual-role protected areas.
Mitrovich et al. 2020 (*in* CDFW 2020)	Multiple species	USA	Review of effects of recreation on wildlife; Case study of recreation-wildlife conflicts; discussion of options to balance human interest for recreation and the impacts on wildlife.	Authors provide comprehensive list of recommendations to achieve best recreation and conservation outcomes and minimize negative impacts of recreation.
Mallord et al. 2007	Woodlark (*Lullula arborea*)	England	Impact of recreational disturbance on population size	Bird density lower on sites with more disturbance. Probability of suitable habitat being colonized s lower in areas with greater disturbance. No relationship between disturbance and daily nest survival rates. Birds on heaths with higher levels of disturbance fledged more chicks (per pair) because of a strong density-dependent increase in reproductive output.
Martin and Réale 2008	Eastern chipmunks (*Tamias striatus*)	Quebec, Canada	Investigated the relationship between exploration, grooming-scanning continuum, emotionality, and docility of individual chipmunks and location of their burrow respective to frequentation by humans; assessed the relationship between hair cortisol and both temperament and frequentation by humans.	Explorative or docile chipmunks were more common in frequented areas. Hair cortisol increased with docility but was not related to human frequentation, indicating that temperament may cause animals to distribute themselves in a non-random way in response to human disturbance.
Miller et al. 2001	Birds, multiple species; Mule deer (*Odocoileus hemionus*)	Colorado, USA	Assessed the “area of influence” for human disturbance treatment by determining the probability that an animal would flush or become alert (for mule deer only).	For mule deer, the presence of a dog resulted in a greater area of influence, alert and flush distance, and distance moved than when a pedestrian was alone while for grassland and forest birds, the reaction to dogs and people were similar.
Miller and Hobbs 2000	Birds (artificial nests), multiple species	Colorado, USA	Effect of recreational trails on the risk of nest predation and nest predator activity at lowland riparian sites.	Predation rates were high (94%). Vulnerability to predation differed by transect types (on-trail, off-trail, near trail); predation rates tended to increase with distance from trails. Birds predators were more common near trails than away from trails, whereas mammals appeared to avoid nests near trails.

Naylor et al. 2009	American elk (*Cervus elaphus*)	Oregon, USA	Measured responses of elk (*Cervus elaphus*) to motorized and nonmotorized off-road recreational disturbance (ATV, mountain biking, horseback riding, hiking).	Elk increased their travel time in response to all disturbance types especially ATVs, followed by mountain biking, hiking, and horseback riding. Feeding time decreased during ATV exposure and resting decreased when elk were subjected to mountain biking and hiking disturbance.
Papouchis et al. 2001	Desert bighorn sheep (*Ovis canadensis nelsoni*)	Utah, USA	Compared behavioral responses of sheep to recreational activity between a low visitor use area and a high visitor use area by observing behavioral responses, distances moved, and duration of responses to vehicles, mountain bikers, and humans on foot.	Hikers caused more severe disturbance than vehicles and mountain bikers. There was considerable individual heterogeneity in responses, as well as differences in responses by male and females depending on breeding status. Avoidance of road corridor by some animals represented 15% less use of potential suitable habitat.
Patton et al. 2019	Mammals, multiple species	California, USA	Examined diel shifts in response to human activity; implication for predator-prey dynamics.	Two species, one predator and one prey, avoid human activity via a temporal shift to become more nocturnal—activity was centered near dawn on days without human activity but nearer to midnight on days with human activity.
Pauli et al. 2016	Golden eagle (*Aquila chrysaetos*)	Idaho, USA (simulation)	Created a model that incorporated tolerance behaviors and natural selection to simulate interactions between recreationists and nesting raptors to assess effect of human disturbance (hiking and OHV) on raptor populations and test if changes in tolerance to disturbance could mitigate negative consequences.	In the presence of recreation, simulated eagle populations had significantly lower and more variable growth rates, population sizes, and territory occupancy. Annual increases in recreation of 1–2% greatly exacerbated population declines; results suggest that long-lived species that experience encroachment from human activities may not adapt to human disturbance at a rate that compensates for changes in disturbance.
Persons and Eason 2017	White-footed mice (*Peromyscus leucopus*)	Kentucky, USA	Effects of habitat and abiotic factors, and human presence on anti-predator behavior of mice foraging in an urban park.	Increased human presence negatively affected foraging behavior across treatments. Human presence and light pollution led to modification of foraging behavior.
Procko et al. 2022	Mammals	British Columbia, Canada	Used camera traps to monitor human activity and terrestrial mammals in protected areas during and after COVID-19 public closures to discern relative effects of various forms of recreation on mammals.	Species responded variably. Negative effects of hikers on weekly bobcat habitat use; increased cougar detection rates in the during the COVID-19 closure; decreased cougar detection rates and increased black-tailed deer detection rates upon reopening of the protected area to public.
Reed and Merenlender 2008	Mammalian carnivores, multiple species	California, USA	Combined noninvasive survey techniques and DNA verification of species identifications to survey for mammalian carnivores in 28 parks and preserves.	Paired comparisons of neighboring protected areas with and without recreation show that presence of dispersed, nonmotorized recreation led to a five-fold decline in the density of native carnivores and a substantial shift in community composition from native to nonnative species.

Reilley et al. 2017	Mountain lion (*Puma concolor*), Virginia opossum (*Didelphis virginiana*), coyote (*Canis latrans*), striped skunk (*Mephitis mephitis*)	California, USA	Used camera traps to quantify habitat use and activity patterns of wild mammals and human recreationists in protected areas; modeled habitat use with a multi-species occupancy model.	Habitat use was most associated with environmental covariates. Domestic dog presence was negatively associated with habitat use of mountain lions and opossum. Coyotes were more active at night/less active during day in areas with high levels of recreation. Skunks were more active in late morning in areas with human recreation. Smaller nocturnal carnivores may not be directly affected by daytime recreational activities.
Rolando et al. 2013	Multiple species	Italy	Quantify effects of effect of ski-pistes on birds and small mammals.	Ski-pistes below tree line produce a negative edge effect and were associated with lower bird diversity and species richness; forest plots adjacent to ski-pistes had lower bird abundance; small forest mammals avoid ski-pistes, but open habitat species colonized them.
Rosenthal et al. 2022	Multiple (at-risk) species	Canada	Conducted systematic comparison of threat categories for 300 Canadian species at risk.	Accounting for threat intensity, recreational activities was the third-greatest threat to species at risk in following “Invasive Species” and “Roads and Railroads”. Among species for which recreational activities posed at least a low-level threat the second most common recreational threat was hiking (after off-road vehicle use).
Rutz et al. 2020	Multiple species	Global	Discussion of COVID-19 lockdown effects on wildlife and the opportunity this presents for researchers to quantify the effects of human activity on wildlife.	Reduction in human mobility during Covid-19 shutdown (“Anthropause”) is unparalleled. Anecdotal observations show wildlife responded by increased movement into new places, etc. Authors encourage and discuss how collaborative research on Anthropause effects can maximize scientific insight and enable detailed, mechanistic understanding of human-wildlife interactions.
Salvatori et al. 2023	Mammals	Italy	Used systematic camera trapping over seven years to examine if tourism affected wild mammals and if it elicited spatial or temporal avoidance; estimated trends in occurrence at community and species levels.	Human presence intensified over 7-year period and both community and most species-level occurrences increased. However, human activities caused a strong temporal avoidance in the whole community, especially in most disturbed sites, while spatial avoidance was observed only for bigger-sized species.
Schroeder et al. 2012	House sparrow (*Passer domesticus*)	United Kingdom	Examined how noise might reduce reproductive output in passerine birds: e.g., by impairing mate choice, by reducing territory quality, and/or by impeding chick development.	Nests in areas affected by noise from large generators produced fewer young, of lower body mass, and fewer recruits; females nesting in noisy areas fed young less often. Nest box occupancy, parental body mass, age and reproductive investment did not differ significantly between noisy and quiet areas.

Schrimpf et al. 2021	Birds, multiple species	Canada and USA	Used records of >4.3 million birds observed by volunteers from March to May 2017-2020 to examine how reduced human activity during COVID-19 altered avian land use.	Counts of 80% of focal bird species changed in pandemic-altered areas, usually increasing in comparison to pre-pandemic abundances in urban habitat, near major roads and airports, and in counties where lockdowns were more pronounced or concurrent with peak bird migration.
Shier et al. 2012	Stephen's kangaroo rat (*Dipodomys stephensi*; SKR)	California, USA	Examined response of SKR to playbacks of footdrumming overlaid with experimental and control background noises.	Spectral characteristics of traffic noise overlap extensively with footdrumming signals of SKR. Traffic noise masks, and may mimic, footdrumming signals. Results suggest that anthropogenic noise may function as a deceptive signal.
Shier et al. 2020	Stephen's kangaroo rat (*Dipodomys stephensi*)	California, USA	Impacts of artificial light at night (ALAN) on foraging decisions of kangaroo rats.	Artificial light negatively impacted foraging decisions of endangered kangaroo rats; ALAN reduces habitat suitability and may potentially impede the recovery of at-risk nocturnal rodents.
Shutt et al. 2014	Western lowland gorillas (*Gorilla gorilla gorilla*)	Central African Republic	Investigated effects of ecotourism on the faecal glucocorticoid metabolites (FGCM) response of wild gorillas.	Two out of three human-contacted groups had higher FGCMs than unhabituated gorillas. FGCMs increased in between contacts up to 21 days in gorillas under habituation.
Slabbekoorn and Ripmeester 2008	Great tits (*Parus major*); additional songbird species covered in review	Western Europe	Reviewed current evidence for whether and how anthropogenic noise plays a role in patterns of decline in bird diversity and density.	Omnipresence of anthropogenic sounds can negatively affect birds. Behavioral flexibility, such as song plasticity, may allow some species more time to adapt to human-altered environments.
Steven et al. 2011	Birds, multiple species	Global	A review of the recreation ecology literature published in academic journals.	Of 69 papers (1978-2010) that examined recreation effects on birds, 61(88%) found negative impacts, including changes in physiology, immediate behavior, changes in abundance, and reproductive success.
Sun and Liddle 1993	Vegetation	Australia	Examined impacts of recreation (vehicles and walkers) on plant species richness, vegetation characteristics, soil penetration, and soil organic matter.	Plant species differed in sensitivity to degrees of trampling. Woody plants occurred only on untrampled areas. Total species and vegetation height and cover were reduced as wear increased. Plant height was reduced dramatically by even light trampling. No clear relationship between soil organic matter content and trampling intensity.
Suraci et al. 2019	Mammals	California, USA	Conducted a landscape-scale playback experiment using a recording of humans speaking to generate a "landscape of fear" and examined behavioral response of wildlife communities.	Large carnivores avoided human voices and moved more cautiously when hearing humans; medium-sized carnivores became more elusive and reduced foraging; small mammals increased habitat use and foraging.

Sytsma et al. 2022	Mammals	Glacier Bay National Park, Alaska, USA	Used camera traps to investigate the spatial and temporal responses of large mammals to experimentally manipulated levels of human activity in a protected area.	Detections did not exceed five per week for any species unless human activity was absent. However, spatial and temporal patterns of wildlife activity in relation to human activity were nuanced and species-specific.
Taylor and Knight 2003	Bison (*Bison bison*), mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra americana*)	Utah, USA	Measured responses of animals to hikers and mountain bikers at a state park by comparing alert distance, flight distance, and distance moved.	Based on a 200-m "area of influence" (7%) of park was potentially unsuitable for wildlife due to disturbance from recreation. Wildlife did not respond differently to mountain biking vs. hiking; there was a negative relationship between wildlife body size and response.
Thompson 2015	Birds, multiple species	Ontario, Canada	Impacts of recreational trails on a forest-dwelling bird community.	Significant positive influence of the area of trail-free habitat on bird density, but not species richness. Birds that nest or forage on the ground exhibited greatest response to presence of recreational trails.
Tost et al. 2020	Black grouse (*Tetrao tetrix*)	Germany	Trail use and activity impacts on habitat use of an endangered grouse.	Birds avoided the vicinity of public routes at distances directly related to intensity of human activity. Recreational disturbances appeared to significantly affect the effective habitat availability.
Wells et al. 2012	Native and non-native plants, multiple species	Colorado, USA	Examined distribution of alien plants at trailheads and trails.	Plant communities at trailheads and trails, and seed banks at trailheads, contain substantial diversity and abundance of non-native plants. Recreational trails may function as corridors that facilitate the spread of non-native species into wildlands.
Weston and Stankowich 2014	Multiple species	Global	This book chapter reviews evidence of disturbance to wildlife caused by dogs not accompanied by humans.	Summary of evidence from literature of dog disturbance on wild birds and mammals, as well as reptilian and amphibian species. Provides management recommendations.
Wheat and Wilmers 2016	Brown bears (*Ursus arctos*)	Alaska, USA	Tested how habituation and fear drive the foraging ecology of bears feeding on salmon.	Higher human activity was associated with increased nocturnality of non-habituated bears, likely leading to suboptimal foraging, but had no effect on habituated individuals.

Appendix B. Alternatives for public access and recreation in Dana Point and coastal Orange County.

Coastal Open Space / Park Public Access Opportunities in Orange County[1]			
Open Space Name	**Ownership/ Land Manager**	**Size (acres)**	**Trail Length (miles)**
Within Dana Point City Limits			
Bluff Top Trail	City of Dana Point	n/a	0.2
Chloe Luke Overlook	City of Dana Point	0.4	n/a
Crystal Cove Park (aka Ocean Knoll)	City of Dana Point	1.6	n/a
Dana Cove Park	Orange County	5.4	n/a
Dana Point Harbor Park	Orange County	5.9	2
Doheny State Beach	California Department of Parks and Recreation	76	7
Harbor Point	City of Dana Point	9.3	0.3
Hilltop	City of Dana Point	11.7	0.7
Heritage	City of Dana Point	16.1	1
Lantern Bay	Orange County	15	1
Louise Leydon	City of Dana Point	0.5	n/a
Palisades Gazebo Park	City of Dana Point	0.7	n/a
Pines Park	City of Dana Point	4.7	n/a
Salt Creek Beach County Park	Orange County	45	1.2
Sea Terrace Park	City of Dana Point	27	0.3
Sea View Park	City of Dana Point	0.5	0.4
Strand Vista Park (South Strands Park)	City of Dana Point	16	1.2
Sycamore Creek Trail	City of Dana Point	n/a	0.5
Total		**236**	**16**
Coastal Orange County			
Aliso and Wood Canyons Wilderness Park	Orange County	4,500	30
Aliso Beach Park	Orange County	39	n/a
Aliso Creek County Beach	Orange County	27	n/a
Bolsa Chica Ecological Reserve	California State Lands Commission	1,300	4.5
Buck Gully Preserve	City of Newport Beach	298	4.5
Capistrano Beach Park	Orange County	55	3.9
Corona del Mar State Beach	California Department of Parks and Recreation	35.8	0.5
Cresent Bay Point Park	Orange County	1.5	n/a
Crystal Cove State Park	California Department of Parks and Recreation	3,936	20

Coastal Open Space / Park Public Access Opportunities in Orange County[1]			
Open Space Name	**Ownership/ Land Manager**	**Size (acres)**	**Trail Length (miles)**
Heisler Park	City of Laguna Beach	8.47	1.5
Huntington State Beach	California Department of Parks and Recreation	121	15.7
Laguna Coast Wilderness Park	Orange County	7,000	40
Laguna Laurel Ecological Reserve	California Department of Fish and Wildlife	78	3.3
Laguna Niguel Regional Park	Orange County	227	1.8
Lantern Bay	Orange County	15	1
Marblehead (Sea Summit) Preserve	Center for Natural Lands Management[2]	106	4
Newport Beach Marine Life Refuge	Orange County	16	n/a
Pacific Horizon Preserve	Orange County Transportation Authority	151	n/a
San Clemente State Beach	California Department of Parks and Recreation		4.5
Santa Ana River County Beach	Orange County		1
Seal Beach National Wildlife Refuge	United States Fish and Wildlife Service	965	2
Talbert Nature Preserve	Orange County	190	6.7
Treasure Island Park	City of Laguna Beach	10.3	0.9
Upper Newport Bay Ecological Reserve	California Department of Fish and Wildlife	752	8
Upper Newport Bay Nature Preserve	Orange County	135	8
Subtotal		**19,967**	**162**
Total		**20,203**	**178**

Acreage and mileage estimates are based on information available on agency websites and Esri ArcGIS.
[1] Open space and parks found within the California Coastal Zone in Orange County, does not mean the coastline is accessible at all of these sites and it is not a definitive list.
[2]CNLM is the perpetual land manager, not the landowner.

VIA E-MAIL

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Re: Draft Updated Habitat Mitigation and Monitoring Plan for Public Access at Dana Point Preserve Dated March 14, 2023

Dear Ms. Rogers:

The City is in receipt of your letter dated March 14, 2023, which attaches a Draft Updated Habitat Mitigation and Monitoring Plan at Dana Point Preserve ("HMMP Update") prepared by the Center for Natural Lands Management ("CNLM"). In your letter, you request that the City of Dana Point ("City") (among other agencies) approve the HMMP Update. The purpose of this letter is to inform you that the City **does not** approve of the HMMP Update for each of the following reasons:

First, as we have advised you in several meetings, approval of the HMMP will require a Coastal Development Permit ("CDP"). Staff cannot approve it on behalf of the City without following the proper procedure which allows for public input, and a transparent public process. This is the case without regard to the substantive concerns the City has, which are noted below. Stated otherwise, regardless of the substance of the changes contained in the HMMP Update, your request ignores the proper process for approval of the proposed changes.

Next, the primary substantive change proposed by the HMMP Update is a proposal to reduce the days and hours of public access from seven (7) days a week from 7:00 am to sunset to four (4) days a week (Tues, Thurs, Sat, Sun) from 8:00 am to 6:00 pm in the summer and 8:00 am to 4:00 pm in the winter. This change constitutes "development" under the Coastal Act and the City's Municipal Code including because it results in a change in the intensity of land use and a change in access to Strand Beach. As such, without regard to any other reason for requiring a CDP, the proposed changes contained within the HMMP Update require approval by way of a CDP. Indeed, as the California Coastal Commission clearly indicated in its November 4, 2021, letter to CNLM and the City, daily hours of operation for the Nature Trail and Overlook Areas (and/or implementation of any management measures), cannot be lawfully established or restricted without an approved CDP. Any action on the part of CNLM to limit public access absent a duly approved CDP is null and void and in violation of the Coastal Act and the governing Entitlement Documents.

Equally important is the fact the City is the "recipient" or holder of the public access easement contained in the Conservation Easement, and hence is the appropriate entity to establish operating hours for the Nature Trail and Overlooks. (See, HDCP, Pg. 3-37, Table 3.4.5, Pg. 4-49, Table 4.5.1, Pg. 5-12, Section 5.5(B) ["The Headlands Conservation Park has been established to conserve 27.9 acres of sensitive flora and fauna on the Headlands. To protect this natural habitat, only limited portions of the area will accommodate passive uses, such as a bluff top trail, security fencing, overlooks, seating, and signage. ***Times of access to the bluff top trail will be determined by the receiving public agency."***].) While CNLM should submit an application for a CDP to update other aspects of the HMMP, as we have discussed multiple times, the City is responsible for setting hours for the Nature Trail and Overlooks. Hence, the establishment of operational hours should not be part of the HMMP or any CDP application submitted by CNLM.

Finally, and aside from the fact the City is responsible to establish operational hours, the City continues to have concerns regarding the proposed substantial limitation on public access proposed in the HMMP Update which it has repeatedly expressed to CNLM. These concerns were not only relayed in the multiple meetings between CNLM and the City, and in the ongoing litigation, but were also contained in the letter I provided to CNLM dated July 28, 2022. That letter makes clear that if CNLM proposed an update to the HMMP that restricted public access to fewer days and hours than is currently permitted, City staff would not recommend that it be approved for a variety of reasons. These reasons include that such changes would impede public access to the Nature Trail and Overlook Areas in a manner that conflicts with: (1) the City's (and public's) public access easement rights; (2) the entitlements that govern the use of the Dana Point Preserve, and (3) the Coastal Act.

In sum, the City does not approve the proposed HMMP Update for all the forgoing reasons.

Sincerely,

Brenda Wisneski
Director of Community Development

cc (*via e-mail*):

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SITE ACCESS FOR RESEARCH AGREEMENT (“Agreement”)

Pacific pocket mouse trapping and conservation breeding program

Pertaining to the CNLM Dana Point Preserve (S033)

Effective as of August 4, 2023, the Center for Natural Lands Management (“CNLM”) hereby grants to Zoological Society of San Diego d/b/a San Diego Zoo Wildlife Alliance (“SDZWA”) access to enter certain property owned and managed by CNLM for the purpose of locating, trapping, and removing a small number of Pacific pocket mice (*Perognathus longimembris pacificus*) for inclusion in a captive breeding project.

RECITALS

A. CNLM is a nonprofit organization dedicated to the protection and management of sensitive and significant natural habitats and rare and listed species through perpetual, science-based stewardship.

B. CNLM is the owner and habitat manager of certain real properly known as the Dana Point Preserve (“Preserve”), County of Orange, California (Exhibit A). This iconic preserve retains the distinction of having been the only recently confirmed occupied Pacific pocket mouse habitat in 1994, and the preserve whose imminent threat of development was driving force in the federal listing of the species on February 3, 1994 (USFWS 1994). CNLM has the legal authority to enter into this Site Access for Research Agreement (Agreement) as holder of fee title of the Preserve since December 2005.

C. SDZWA proposes to conduct Research, as further described in Exhibit A attached hereto, on Preserve, and CNLM intends to permit access for such Research pursuant to the terms of this Agreement.

D. CNLM, in providing conditional access to SDZWA for the stated purposes, is not committing to: i) additional take of PPM from the Preserve in the future; or ii) allowing any captive-bred or translocated PPM to be placed on the Preserve.

NOW THEREFORE, in consideration of the promises and mutual covenants contained herein, CNLM and SDZWA hereby agree as follows:

TERMS AND CONDITIONS

1. Purpose. The purpose of this Agreement is to define the terms and conditions under which SDZWA will be granted site access to the Preserve for conducting the Research.

2. Term. This Agreement shall be in effect through September 30, 2023.

3. Fee. CNLM is imposing no financial requirements on SDZWA.

4. Take of PPM. A maximum of four (4) individuals of Pacific pocket mouse may be removed from the Preserve for the Research. They may be composed of any number of either sex and of any age. Tissue samples (ear snips) may be taken from every PPM captured.

5. Notice. Prior to any entry onto the Preserve, SDZWA shall give CNLM reasonable notice, at a minimum of seven (7) days, of its intention to enter the Preserve. Unless otherwise provided herein, such notice shall be to the Preserve Manager. Alternatively, Preserve Manager and SDZWA may agree in advance to a Preserve access schedule.

6. Access. Access onto the Preserve shall be limited to individuals, equipment and materials, the presence of which on the Preserve is necessary in order to conduct the Research. This Agreement does not grant SDZWA the right to undertake any activity on the Preserve which will in any way interfere with activities being conducted on the Preserve by CNLM or at its direction. Special access conditions, if any, are detailed in Exhibit B.

7. Acknowledgements and Research Reports/Publications. SDZWA agrees to formally acknowledge CNLM contributions to Research, including the use of Preserve, intellectual contributions by CNLM employees, and other CNLM assistance, in any reports or publications that arise from Research. SDZWA further agrees to provide CNLM in a timely fashion a copy of SDZWA's publications published as a result of the Research, including any thesis or dissertation derived from said Research.

SDZWA agrees to provide quarterly reports to CNLM of all activities and results in the conservation breeding program that include mice collected from the Preserve.

8. Special Provisions and Conditions. Special provisions and conditions, if any, imposed upon and agreed to by SDZWA, are described in Exhibit C, attached.

9. Non-Interference. SDZWA shall use its best efforts to avoid interfering in any way with the activities being conducted on the Preserve by CNLM. SDZWA shall immediately halt any and all activities on the Preserve at the request of CNLM if CNLM determines that any activity is (a) being conducted in violation of this Agreement, (b) inconsistent with or not covered by this Agreement, or (c) likely to negatively impact the native species, habitat, or environmental values of the Preserve as determined by CNLM.

10. Conduct of Activities. SDZWA will conduct Research in compliance with all Federal, state, and local laws, ordinances, and orders including, without limitation, any permit, notice, or approval requirements.

11. Habitat Protection and Damage. SDZWA agrees that (a) it is responsible for any and all damage or destruction it causes to the Preserve, Preserve species and habitat, and/or CNLM property (including fences, gates, signage, roads, and trails); (b) no trash or discarded material will be left on Preserve at any time by SDZWA; (c) no exotic or non-local native species will be introduced into the Preserve; and (d) all equipment, stakes, temporary fences, enclosures, and similar materials will be completely removed from the Preserve at the conclusion of each research period/season and the Research.

12. Responsibility and Accountability.

a. SDZWA shall have full and sole responsibility for the safety of any of its agents, and contractors, and for the operation, safety, security, and proper handling of all equipment and materials brought on or about the Preserve. SDZWA shall hold harmless, indemnify, and defend CNLM and its directors, officers, employees, agents, and invitees (collectively "Indemnified Parties") from and against all liabilities, penalties, costs, losses, damages, expenses, causes of action, claims, demands, or judgment, including without limitation, reasonable attorneys' fees (collectively "Claims"), arising from or in any way connected with this Agreement including, without limitation, Claims for injury to or the death of any person, or physical damages to any property, resulting from any act, omission, condition, or other matter related to or occurring on or about the Preserve, but only in proportion to and to the extent that such Claims arise from the negligent or intentional acts or omissions of SDZWA, its officers, agents, or employees.

b. SDZWA agrees that all individuals participating in Research on the Preserve will be under its direct supervision and are subject to the terms and conditions of this Agreement.

c. SDZWA and Research Assistants shall maintain a copy of this Agreement and other supporting authorizations and permits on its person at all times while on the Preserve and shall present same to CNLM employees or agents, the property landowners (if different), and other authorities (including law enforcement and resource agency officials), when requested.

d. SDZWA will ensure that all individuals participating in Research on the Preserve will execute a release of liability form, a sample of which is attached hereto as Exhibit D; and SDZWA assumes all liability and responsibility for failure of any such individual to execute such form.

13. "INTENTIONALLY LEFT BLANK"

14. Dispute Resolution. In the event a dispute shall arise between the parties to this Agreement that cannot be resolved by negotiating in good faith or through

mediation, it is agreed that the dispute shall then be referred to an arbitration service selected by agreement of the parties. The arbitrator's decision shall be final and legally binding and judgment may be entered thereon. Each party shall be responsible for its share of the arbitration fees in accordance with the applicable rules of arbitration. In the event a party fails to proceed with arbitration, unsuccessfully challenges the arbitrator's award, or fails to comply with the arbitrator's award, the other party is entitled to costs of suit, including a reasonable attorney's fee for having to compel arbitration or defend or enforce the award.

15. Notices. All notices to be given under this Agreement shall be in writing and addressed to the recipient as set forth below:

SDZWA:	Ron Swaisgood Brown Endowed Director of Recovery Ecology San Diego Zoo Institute for Conservation Research 15600 San Pasqual Valley Road Escondido, CA 92027 Telephone: (760) 291-5427 Email: RSwaisgood@sandiegozoo.org
And a copy to:	Wendy Bulger General Counsel San Diego Zoo Wildlife Alliance 2550 5th Ave., Suite 520 San Diego, CA 92103 Telephone: (619) 685-3264
CNLM:	Dr. Deborah L. Rogers Co-Executive Director & Director of Conservation Science and Stewardship Center for Natural Lands Management 27258 Via Industria, Suite B Temecula, CA 92590 Telephone: (760) 731-7790 Ext. 103 Facsimile: (760) 731-7791 Email: drogers@cnlm.org

All notices shall be deemed effectively given: (a) when delivered, if delivered personally or by couriered mail service (such as, for example only, Federal Express or DHL); (b) five (5) days after such notice has been deposited in the United States mail postage prepaid, if mailed certified or registered U.S. mail, return receipt requested; or (c) when received by the party for which notice is intended if given in any other manner.

In an emergency, contact all other parties immediately.

16. General Provisions.

a. Applicable Law. The validity of this Agreement and of its terms or provisions, as well as the rights and duties of the parties hereunder, shall be governed and interpreted in accordance with the laws of the State of California.

b. Nonwaiver. No provision of this Agreement shall be waived, by conduct or otherwise, except in writing signed by both parties. No assent or waiver whether expressed or implied, of any breach of any one or more of the covenants, conditions, or provisions set forth in this Agreement shall be deemed to be a waiver of any subsequent breach of the same or any other covenant, condition, or provision hereof.

c. Severability. If any provision of this Agreement shall be adjudged invalid by any court, the remaining provisions of this Agreement shall remain valid and enforced to the full extent permitted by law.

d. Authority. The individuals signing this Agreement represent that they are authorized to execute this document, that their execution of this document shall be binding on the parties that they represent, and that the other party hereto may rely upon such representation.

e. Integrated Agreement. This Agreement, including all Exhibits attached hereto, contains the entire understanding and agreement between the parties, sets forth all the rights and duties of the parties with respect to the subject matter hereof, and replaces and supersedes all previous agreements or understandings, whether written or oral, relating thereto. No modification of this Agreement or any of its terms shall be effective unless in writing and signed by the duly authorized representatives of the parties.

f. Cancellation. Either party reserves the right to terminate this Agreement, in whole or in part, with thirty (30) days prior written notice if it determines it to be in the best interest of either party.

SIGNATURES ON FOLLOWING PAGE.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the day and year first above written.

Zoological Society of San Diego
d/b/a San Diego Zoo Wildlife Alliance

By: DocuSigned by: Shawn Dixon
741EB4932ED04AF...

Shawn Dixon
Chief Operating Officer

Date: 8/10/2023

References

Center for Natural Lands Management

By: D L Rogers

Deborah L. Rogers
Co-Executive Director & Director of
Conservation Science and Stewardship

Date: August 11, 2023

EXHIBIT A

Research Description

Provided by Dr. Debra M. Shier
Brown Endowed Associate Director of Recovery Ecology
San Diego Zoo Wildlife Alliance
Email: dshier@sdzwa.org

The Pacific Pocket Mice (PPM) collected from the Dana Point Preserve (DP) will be used in the conservation breeding program to increase the genetic diversity of the captive population and maintain representation of DP alleles in an ex situ population. We will conduct both intrapopulation matings and interpopulation matings (between DP and South San Mateo or Santa Margarita) to better evaluate the fitness of admixed and non-admixed animals and increase our power to detect fitness impacts of outcrossing. Finally, as described in the Genetic Management Plan, we wish to further explore in captivity the ability to perform backcrosses to maintain the karyotype characteristic of DP in admixed PPM.

Because the goal of collection is to increase genetic diversity of the captive population, we propose to set trapping lines throughout habitat to maximize the distance between mice that are collected. This then provides an opportunity for the collection of tissue for the evaluation of the status of the DP population. We will take a genetic sample using the ear snip method from every PPM captured. The PPM genetic management plan recommends collection of tissue from an estimated 1-3 mice per 50 m x 50 m area. Because the suitable PPM habitat in the DP headlands includes approximately 25 50 x 50m grids, collection of tissue from no more than 75 individuals would be used for a full evaluation of the status of the genetics of the DP population. Lower sample sizes are still valuable for genetic monitoring. We will conduct microsatellite analyses on tissue samples from the mice captured at the DP headlands by the end of 2023. A full evaluation of the current status of the DP population using SNP-based analysis will be conducted as soon as possible.

To evaluate abundance of PPM currently present at the Dana Point (DP) headlands, we used the 2023 track tube data from CNLM and followed protocols established in 2013 for the use of track tube data in support of collections at South San Mateo. Because the relationship between track tube detections and number of PPM is not well understood, in 2013 we used PPM home range to approximate how many track tubes a single PPM might be likely to visit on average over one week (i.e., the time interval of the track tube data). Based on a home range greater than 12 meters but less than 25 meters in diameter, we assumed a PPM would be likely to visit track tubes within 12.5 meters of one another but not 25 meters apart. Accordingly, we assumed a single PPM could visit up to 4 track tubes during a week, suggesting a maximum population density of around 16 PPM per 1 hectare sampling grid at Camp Pendleton.

At DP headlands, trap tubes are placed in two 12 m x 12 m quadrants of each 24 x 24 m grid cell resulting in lower track tube densities than are used at Camp Pendleton and staggered trap spacing of 16.9 meters between traps within the same grid cell and 24 m among grid cells. Because combining the two quadrants of data for each grid cell at DP is of a similar scale to combining the 4-track tube data at Camp Pendleton, we assumed the combined grid cell level data at Dana Point approximates the size of a PPM's home range. Based on this assumption, we estimate that up to 69 individual PPM (average= 48.6) have been detected during the five weeks of monitoring at Dana Point year (Table 1).

Table 1. Number of Grid Cells within which PPM were detected each week from May 31 – Jun 27, 2023.

Survey Date	May 31	June 6	June 13	June 20	June 27
Number of PPM detections	28	52	69	56	38

As detailed in the Draft Genetic Management Plan, we would like to collect 4 mice (2 females and 2 males) to bring into the captive colony which, based on the approximated size of the DP population, is consistent with the criteria that we have been using that collections will not exceed 10% of adults or 20% of young of the year to minimize the impact to the source population.

Preferably we would like to collect 4 young of the year, but if fewer than 4 young of the year are captured, in addition to captured young of the year, we propose to collect no more than 3 adults to reach our goal.

EXHIBIT B

Access Special Conditions

1. Access for Research is provided for a maximum of five (5) trap-nights.

2. SDZWA will only enter and exit the Preserve through the access gates. The Preserve Manager will provide access if entrance occurs after gates are locked (sunset daily).

3. SDZWA will not allow access onto the Preserve for anyone who is not associated with the research project or who has not signed a Release Form (Exhibit D).

4. When working after public-access hours (i.e., sunset to 7:00 a.m. daily), if the SDZWA observes any members of the general public onsite and if CNLM staff are not present at that time, the SDZWA will:

    i. If safe, approach and notify the individual(s) that the Preserve is closed and he/she/they must leave;
    ii. If not deemed safe or in the event of non-compliance, notify law enforcement ('911'); and
    iii. Notify the Preserve Manager of any trespassers observed or encountered on-site during business hours or by email.

5. SDZWA will secure the site before, during, and after work is completed. No gates shall be left open, ajar, or unlocked.

Preserve Manager Contact Information:

Korie Merrill
CNLM Regional Preserve Manager, South Coast Region
Email: kmerrill@cnlm.org
Phone: (760) 731-7790 Ext. 204
Direct: (949) 218-1145

EXHIBIT C

Special Provisions and Conditions

1. Field activities shall be conducted in such a manner as to not injure or kill federally threatened coastal California gnatcatcher (*Polioptila californica californica*). The Preserve Manager will brief SDZWA on any necessary precautions and these will be observed at all times while on the Preserve.

2. Field activities will also be conducted in such a manner to avoid impacts on other sensitive resources such as rare plants, the general location and sensitivity of which to be provided by Preserve Manager, as appropriate.

3. Trapping route (to trap locations) will be determined, flagged, and faithfully followed to minimize disturbance to habitat and avoid any active rodent burrows. Trapping route and trap locations must be approved by the Preserve Manager.

4. Trapping will be immediately stopped if there is a trap injury or death of any PPM or any other injury or death, any trap injury or death of any nontarget animal, or at the discretion of the Preserve Manager. Additionally, if trap success is low enough to suggest that the size of the Dana Point PPM population has been significantly overestimated (e.g., failure to capture at least 20 individuals), SDZWA will confer with CNLM and likely postpone collections to another time.

5. No pets (including dogs on-leash) are allowed within the Preserve.

6. Guidance for Pacific pocket mouse trapping: Trapping strategy for capturing individuals for the captive breeding program shall be strongly informed by minimizing stress on Preserve pocket mice and other listed or sensitive species, minimizing likelihood of repeated captures of same individuals, and reducing impact on the breeding activity of the resident wild population.

7. Limits for removal of Pacific pocket mice from Preserve: No pregnant or lactating individuals are to be removed from the Preserve. A maximum of four (4) individuals of Pacific pocket mouse may be removed from the Preserve for the Research. They may be composed of any number of either sex and of any age. Tissue samples (ear snips) may be taken from all (unique) mice captured. Only one sample per mouse is allowed. The Preserve Manager must approve: 1) the selection of mice for removal and 2) the means by which the selections will be made (e.g., length of time in traps or other types of captivity while decisions are made).

EXHIBIT D

RELEASE FORM

ACCESS FOR RESEARCH ASSISTANCE ON (S033) DANA POINT PRESERVE ("Preserve")

Dear ____
(PRINT COMPLETE NAME OF INDIVIDUAL SEEKING LIMITED SITE ACCESS)

You have requested permission from the Center for Natural Lands Management (CNLM) to enter upon the Preserve for the purpose of conducting research on the Pacific pocket mouse as more fully described in the August 2023 Site Access for Research Agreement ("Agreement') between CNLM and Zoological Society of San Diego d/b/a San Diego Zoo Wildlife Alliance ("SDZWA").

In consideration of CNLM, its officers, directors, employees, and agents (collectively, "Released Parties") agreement to permit your participation in the foregoing activity on the Preserve at various times between (date of Agreement execution) and September 30, 2023, you agree to each of the following conditions:

1. You acknowledge that you are aware and have been informed that the Preserve may present risk to your safety. You agree to assume all risks involved in your visit to the Preserve. You agree to take all necessary precautions while on or about the Preserve to avoid injury to yourself or others. You also acknowledge that you are physically able to undertake the activities contemplated on the Preserve. You agree to follow the rules for the Preserve provided to you by CNLM, or by SDZWA as may be required by the Agreement. You agree that although they may not choose to be present during your visit to the Preserve, neither CNLM nor any other Released Party shall have any obligation to you.

2. You hereby release each and all of the Released Parties from any and all liability, claims, causes of action, damage, loss, casualty, expense, or similar items, in law or in equity, whether known or unknown, that you may suffer or incur as a result of, or relating to, your visit(s) to the Preserve.

3. You hereby agree to indemnify, defend and hold each and all of the Released Parties, harmless in all respects from any and all claims causes of action, judgments costs, expenses, attorney's fees, and liabilities (collectively "Claims"), whatsoever, arising in any way in connection with your visit(s) to the Property, but only in proportion to and to the extent that such Claims arise from the negligent or intentional acts or omissions of SDZWA, its officers, agents, or employees.

4. You agree to accept any and all financial and legal responsibility for any fire-fighting activities that are a direct result of your activities while on the Preserve.

Please indicate your agreement to the above by signing this letter.

Sincerely yours,

CENTER FOR NATURAL LANDS MANAGEMENT

The above is hereby agreed to and confirmed this _____ day of _______________, 2023.

PRINT NAME   SIGNATURE:

___________________________________   ___________________________________

Address: ____

Telephone: ____

STATE OF CALIFORNIA - NATURAL RESOURCES AGENCY GAVIN NEWSOM, *GOVERNOR*

CALIFORNIA COASTAL COMMISSION
South Coast Area Office
301 E. Ocean Blvd., Suite 3000
Long Beach, CA 90802-4302
(562) 590-5071

SENT VIA REGULAR MAIL AND EMAIL

December 14, 2023

Brenda Wisneski
City of Dana Point
Director of Community Development
33282 Golden Lantern
Dana Point, CA 92629-1805

Re: Headlands Conservation Park Trail Hours

Dear Ms. Wisneski:

We received a copy of your letter to Center for Natural Lands Management ("CNLM") on August 1, 2023, which, amongst other things, suggests that the City of Dana Point is responsible for setting hours for the blufftop trail in the Headlands Conservation Park, which is a position that is not supported by the Commission-certified Local Coastal Program for the City of Dana Point, as described below. Regardless, we are not aware of the City taking action to authorize the trail hours that it has sought in litigation with CNLM[1] – hours that we believe constitute an ongoing inconsistency with the Local Coastal Program.

We understand the importance of public access generally and work to protect it statewide. However, we are also concerned that the City's insistence upon these hours is endangering the existence of the federally threatened Pacific Pocket Mouse, a small population of which is supported by the Headlands Conservation Park. Managing public use of the Headlands Conservation Park in a way that minimizes impacts on this threatened species is critical to the survival of this species, which is just another piece in protecting the ecosystem and its critical functions. As the United States Fish and Wildlife Service and California Department of Fish and Wildlife put it in their joint March 23, 2022 to CNLM, "Due to the small size and sensitivity of the PPM population, during development of the HDCP and HMMP we emphasized that it would be critical to design and regulate public use to safeguard PPM and other sensitive flora and fauna within the Preserve."

In order to protect the Pacific Pocket Mouse and undo the inconsistency with the Local Coastal Program with respect to trail hours described herein, we are asking the City to forego its insistence on maintaining the existing hours of operation and process CNLM's request to establish hours of operation through an amendment to the Headlands Conservation Park management plan or a coastal development permit, as CNLM has requested to do. We are hopeful that such a compromise will allow for both public access and the survival of a threatened species.

[1] See, for instance, page 9 of the City's Cross-Complaint for Civil Fines and Injunctive Relief for Violation of the Coastal Act, which says, in part, that "The City responded on or about June 19, 2020, again requesting the Nature Trail be returned to normal operating hours and advised CNLM of the City's successful management of its other, opened trails at the Headlands, pointing out COVID had not been a challenge related to such trails."

City Trail Hours are Detrimental to PPM and Inconsistent with the LCP

The Local Coastal Program requires that trail hours must be found to be consistent with policies of the Local Coastal Program. Table 3.4.5 (Headlands Conservation Park) of the Local Coastal Program describes the balanced approach to access and protecting habitat that must occur at the Headlands Conservation Park. It states, in part, that:

> The Headlands Conservation Park includes a limited bluff top trail, spectacular views of the ocean, and limited visitor access to the coastline and natural environment…
>
> Balancing the desire for limited public access and views along the perimeter, this planning area also is designed to protect a number of sensitive flora and fauna, including the Pacific pocket mouse. As a result, and to protect this natural resource area from overuse, only limited portions of the area will accommodate passive uses, such as the bluff top trails, security fencing, overlooks, seating, and signage. The bluff top trail shall be sited to avoid and setback at least 25 feet from coastal bluff scrub in the vicinity of the bluff edge. The receiving agency or nonprofit entity will establish hours of operation for the bluff top trail.

With specific regard to how public access and habitat protection will be balanced with respect to trail hours, Section 4.5.1 of the Local Coastal Program states, in part:

> The bluff-top trail in the Headlands Conservation Park shall be accessible to the public year-round, except for any specific period determined by the resources agencies to protect on site resources. The recipient public agency or non-profit entity will determine hours of daily operation.

As is evident from the joint May 15, 2023 letter from the resources agencies, United States Fish and Wildlife Service and California Department of Fish and Wildlife, the resources agencies share the concern here and support CNLM's proposed trail hours to better protect the Pacific Pocket Mouse. For instance, the resources agencies state that "As relayed in our prior comment letter, the status of each of the extant PPM populations warrants a conservative management approach to safeguard them from extirpation, especially at Dana Point, which supports the smallest and most vulnerable PPM population to environmental, demographic and genetic threats. Because public access is one of the few threats to the Dana Point population that can be effectively managed and could appreciably influence the size of the Dana Point population, we continue to support the proposal to more closely monitor and manage public access as a component of the adaptive management plan for the Preserve."

The City's trail hours are inconsistent with this recommendation by the resources agencies to regulate trail use to better protect the pocket mouse, and thus are inconsistent with the Local Coastal Program.

Authorize Hours of Operation through a CDP

As noted in previous correspondence, the Headlands project coastal development permit, CDP No. 04-23, does not authorize specific hours of operation for the trail. Therefore, a coastal development permit is required to authorize hours of operation for the bluff top trail. This may occur through review and approval of the compliance documents for the existing Headlands coastal development permit, e.g. the Habitat Management and Monitoring Plan, or a new coastal development permit. Regarding the former option, Condition No. 38 of CDP No. 04-23 requires submittal of a habitat management plan (i.e. the Habitat Management and Monitoring Plan), and the preliminary drafts of the Habitat Management and Monitoring Plan HMP do contemplate trail hours. This is consistent with the Dana Point Municipal Code's requirements for management plans, see Section 9.27.030(a)(4)(H), which says:

> (H) Management Plan (Minimum Requirements). A management plan may be required in conjunction with a dedication of public access in any case where there is substantial evidence of potential conflicts between public access use and other uses on or immediately adjacent to the site. Examples include access in areas of sensitive habitats, agricultural resources, or significant hazards, or adjoining residential neighborhoods or military security areas. The plan shall be prepared by the accepting agency and approved by the City of Dana Point prior to the opening of the access to public use. Where applicable, the plan should specify management controls on time and intensity of use, standards for privacy buffers, and requirements for maintenance of aesthetic values through such measures as litter control.

The Habitat Management and Monitoring Plan thus could be an option for CNLM to set hours of operation, as approved by the City, wildlife agencies, and the Coastal Commission.

CNLM Sets the Hours of Operation

The Local Coastal Program identifies CNLM, which is the recipient of fee title to the Headlands Conservation Park, as the entity that sets the trail hours. Table 3.4.5 (Headlands Conservation Park) of the Local Coastal Program says in part that "The receiving agency or non-profit entity will establish hours of operation for the bluff top trail." Table 4.5.1 (Headlands Conservation Park (27.9 Acres) Public Access Program Guidelines) says in part that "The recipient public agency or non-profit entity will determine hours of daily operation."

The Habitat Management and Monitoring Plan, which was prepared by CNLM and a City-hired consulting firm, also designates CNLM as the entity that sets the trail hours. As a preliminary matter, the Habitat Management and Monitoring Plan identifies CNLM as the habitat manager: "Headlands Reserve LLC has entered into an agreement with the Steele Foundation to ensure the perpetual management of the Biological Open Space of the Conservation Park. In turn, the Steele Foundation has selected CNLM as the habitat manager for the Headlands Conservation Park." The Habitat Management and Monitoring Plan then identifies the habitat manager as the entity that controls public access: "The Habitat Manager will be monitoring the consequences of this public access, and making recommendations to the City, which will be responsible for controlling public access for all areas other than the Headlands Conservation Park. Control of public access to the Headlands Conservation Park will be the responsibility of CNLM in consultation with the City of Dana Point. Hours of operation for the Headlands Conservation Park and other areas of Biological Open Space will be 7:00 am to sunset." As noted on numerous occasions in correspondence regarding this matter, CNLM has indeed monitored the consequences of public access and is recommending trail hours to help protect the Pacific Pocket Mouse.

Despite the provisions quoted above, I understand that it is your position that the receiving entity that sets the trail hours is the City. This position is apparently based upon a sentence in the Local Coastal Program, in Section 5.5B, which says in part that "Times of access to the bluff top trail will be determined by the receiving public agency". Since this sentence refers only to a "public agency", which CNLM is not, it is your position then that the receiving entity must be the City, and the item being received is the conservation easement over the Headlands Conservation Park, and not the park itself. Notably, recipient is not defined in the section that you cite, or elsewhere in the Local Coastal Program, to refer to the recipient of the conservation easement. In the section that you cite, there is no mention of the conservation easement at all.

Your position does not account for all of the other iterations of this same sentence in the Local Coastal Program, which are quoted herein, that include reference to a public agency *and* a non-profit entity, e.g. CNLM. In fact, in the same section that you cite as evidence for your position, the next paragraph after the sentence that you quote reads as follows:

> The Headlands Conservation Park also requires a long-term management program to conserve and enhance the sensitive plants and species. An endowment or annual budget will be established by the recipient public or non-profit agency to ensure the long term maintenance and operations of the Headlands Conservation Park.

That sentence that you rely on is clearly an aberration since in each other instance of the analogous sentence in the Local Coastal Program, it refers to both a receiving public agency or non-profit entity.

Conservation Easement does not Transfer Authority to Set the Trail Hours to the City

The conservation easement over the Headlands Conservation Park is not identified by the Local Coastal Program or the Headlands Coastal Development Permit, which govern development at the Headlands Conservation Park, as a mechanism to set trail hours, nor does the easement purport to set trail hours, and thus the easement cannot confer to the City the authority to set trail hours. In fact, the easement references the Habitat Management and Monitoring Plan (referred to as the "Restoration/Revegetation Plans" in the easement) as the document that specifically regulates access to the Headlands Conservation Park. See Section 5.2(d) of the easement, which identifies the following uses as prohibited uses: "Recreational activities, including but not limited to, walking, hiking, bicycling, horseback riding, or fishing (<u>except as described in Section 5.2(d) or unless specifically provided for in the Restoration/Revegetation Plans</u>)." [underlining added for emphasis]

As described above, the Habitat Management and Monitoring Plan identifies CNLM as the entity that sets the trail hours.

Conclusion

We would appreciate your cooperation and assistance in resolving this matter consistent with applicable law, and to assist us in the delicate balance and protection of this critical ecosystem. CNLM has been attempting to establish trail hours that are consistent with the Local Coastal Program since, to our knowledge, at least January 2022, and the City has rejected CNLM's attempts to modify trail hours through an amendment to the Habitat Management and Monitoring Program. If the City will not allow hours to be established that are consistent with the Local Coastal Program through the HMMP process, we suggest that the City process an application for CNLM's proposed hours through the CDP process. We would appreciate it if you would indicate the City's agreement to engage in the HMMP process or accept a CDP application within 15 days of the receipt of this letter so that Commission staff can consider its options to ensure trail hours that are protective of an endangered species, and consistent with the Local Coastal Program, are established in a timely manner. Thank you very much for your time and attention and I look forward to hearing from you.

Sincerely,

Andrew Willis
Enforcement Staff Counsel

cc: Deborah Rogers, CNLM
Jonathan D. Snyder, USFWS
David A. Mayer, CDFW
Lisa Haage, Chief of Enforcement, CCC
Karl Schwing, Deputy Director, CCC