January 20, 2021

Sent via email

Alan Como, AICP
City of Los Angeles
Department of City Planning
221 North Figueroa Street, Suite 1350
Los Angeles, CA 90012
alan.como@lacity.org

Re: Berggruen Institute Project Notice of Preparation (ENV-2019-4565-EIR)

Dear Mr. Como,

On behalf of the Center for Biological Diversity, we are writing to express our concerns regarding the proposed Berggruen Institute Project ("Project") and urge the City of Los Angeles to consider alternatives or mitigation measures that would reduce the scale and footprint of the project and minimize impacts to special-status species, habitat connectivity, and wildfire risk. The Project as proposed would result in loss of native biodiversity and increased wildfire risk, and potentially push the Santa Monica Mountains puma population closer to extinction.

The Center for Biological Diversity ("Center") is a non-profit, public interest environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has over 1.7 million members and online activists throughout California and the United States. The Center and its members have worked for many years to protect imperiled plants and wildlife, open space, air and water quality, and overall quality of life for people in Los Angeles.

I. The Project as proposed may have significant impacts on wildlife movement and habitat connectivity

The California Environmental Quality Act ("CEQA") requires an Environmental Impact Report ("EIR") to provide decision-making bodies and the public with detailed information about the effect a proposed project is likely to have on the environment, to list ways in which the significant effects of a project might be minimized, and to indicate alternatives to the project. (Pub. Res. Code § 21061.) Moreover, CEQA requires a lead agency to mitigate to the extent feasible significant impacts. (CEQA Guidelines § 15064.4.)

If the City does move forward with preparing an EIR, the EIR must adequately assess and mitigate the Project's impacts to local, regional, and global wildlife movement and habitat connectivity. Roads and development create barriers that lead to habitat loss and fragmentation,

which harms native wildlife, plants, and people. As barriers to wildlife movement, poorly-planned development and roads can affect an animal's behavior, movement patterns, reproductive success, and physiological state, which can lead to significant impacts on individual wildlife, populations, communities, landscapes, and ecosystem function (Mitsch and Wilson 1996; Trombulak and Frissell 2000; van der Ree et al. 2011; Brehme et al. 2013; Haddad et al. 2015; Marsh and Jaeger 2015; Ceia-Hasse et al. 2018). For example, habitat fragmentation from roads and development has been shown to cause mortalities and harmful genetic isolation in mountain lions in southern California (Ernest et al. 2014; Riley et al. 2014; Vickers et al. 2015), increase local extinction risk in amphibians and reptiles (Cushman 2006; Brehme et al. 2018), cause high levels of avoidance behavior and mortality in birds and insects (Benítez-López et al. 2010; Loss et al. 2014; Kantola et al. 2019), and alter pollinator behavior and degrade habitats (Trombulak and Frissell 2000; Goverde et al. 2002; Aguilar et al. 2008). Habitat fragmentation also severely impacts plant communities. An 18-year study found that reconnected landscapes had nearly 14% more plant species compared to fragmented habitats, and that number is likely to continue to rise as time passes (Damschen et al. 2019). The authors conclude that efforts to preserve and enhance connectivity will pay off over the long-term (Damschen et al. 2019). In addition, connectivity between high quality habitat areas in heterogeneous landscapes is important to allow for range shifts and species migrations as climate changes (Heller and Zavaleta 2009; Cushman et al. 2013; Krosby et al. 2018). Loss of wildlife connectivity decreases biodiversity and degrades ecosystems.

Edge effects of development in and adjacent to open space, like the proposed Project, will likely impact key, wide-ranging predators, such as mountain lions and bobcats (Crooks 2002; Riley et al. 2006; Delaney et al. 2010; Lee et al. 2012; Smith et al. 2015; Vickers et al. 2015; Smith et al. 2017; Wang et al. 2017), as well as smaller species with poor dispersal abilities, such as song birds, small mammals, and herpetofauna (Cushman 2006; Slabbekoorn and Ripmeester 2008; Benítez-López et al. 2010; Kociolek et al. 2011). Limiting movement and dispersal can affect species' ability to find food, shelter, mates, and refugia after disturbances like fires or floods. Individuals can die off, populations can become isolated, sensitive species can become locally extinct, and important ecological processes like plant pollination and nutrient cycling can be lost. Negative edge effects from human activity, such as traffic, lighting, noise, domestic pets, pollutants, invasive weeds, and increased fire frequency, have been found to be biologically significant up to 300 meters (~1000 feet) away from anthropogenic features in terrestrial systems (Environmental Law Institute 2003)

It is important that the EIR consider corridor redundancy (*i.e*. the availability of alternative pathways for movement) because it allows for improved functional connectivity and resilience. Compared to a single pathway, multiple connections between habitat patches increase the probability of movement across landscapes by a wider variety of species, and they provide more habitat for low-mobility species while still allowing for their dispersal (Mcrae et al., 2012; Olson & Burnett, 2008; Pinto & Keitt, 2008). In addition, corridor redundancy provides resilience to uncertainty, impacts of climate change, and extreme events, like flooding or wildfires, by providing alternate escape routes or refugia for animals seeking safety (Cushman et al., 2013; Mcrae et al., 2008; Mcrae et al., 2012; Olson & Burnett, 2008; Pinto & Keitt, 2008).

Corridor redundancy is critical when considering the impacts of climate change on wildlife movement and habitat connectivity. Climate change is increasing stress on species and ecosystems, causing changes in distribution, phenology, physiology, vital rates, genetics, ecosystem structure and processes, and increasing species extinction risk (Warren et al. 2011). A 2016 analysis found that climate-related local extinctions are already widespread and have occurred in hundreds of species, including almost half of the 976 species surveyed (Wiens 2016). A separate study estimated that nearly half of terrestrial non-flying threatened mammals and nearly one-quarter of threatened birds may have already been negatively impacted by climate change in at least part of their distribution (Pacifici et al. 2017). A 2016 meta-analysis reported that climate change is already impacting 82 percent of key ecological processes that form the foundation of healthy ecosystems and on which humans depend for basic needs (Scheffers et al. 2016). Genes are changing, species' physiology and physical features such as body size are changing, species are moving to try to keep pace with suitable climate space, species are shifting their timing of breeding and migration, and entire ecosystems are under stress (Parmesan and Yohe 2003; Root et al. 2003; Parmesan 2006; Chen et al. 2011; Maclean and Wilson 2011; Warren et al. 2011; Cahill et al. 2012).

When assessing impacts to wildlife movement and habitat connectivity, the City must analyze the Project's potential impacts to riparian corridors. Riparian ecosystems have long been recognized as biodiversity hotspots performing important ecological functions in a transition zone between freshwater systems and upland habitats. Many species that rely on these aquatic habitats also rely on the adjacent upland habitats (*e.g.*, riparian areas along streams, and grassland habitat adjacent to wetlands). In fact, 60% of amphibian species, 16% of reptiles, 34% of birds and 12% of mammals in the Pacific Coast ecoregion depend on riparian-stream systems for survival (Kelsey and West 1998). Many other species, including mountain lions and bobcats, often use riparian areas and natural ridgelines as migration corridors or foraging habitat (Dickson et al, 2005; Hilty & Merenlender, 2004; Jennings & Lewison, 2013; Jennings & Zeller, 2017). Additionally, fish rely on healthy upland areas to influence suitable spawning habitat (Lohse et al. 2008), and agricultural encroachment on these habitats and over-aggressive removal of riparian areas have been identified as a major driver of declines in freshwater and anadromous fish (e.g., Stillwater Sciences 2002; Lohse et al. 2008; Moyle et al. 2011). Therefore, buffers that allow for connectivity between the aquatic resource and upland habitat is vital for many species to persist.

It is estimated that 90-95% of historic riparian habitat in the state has been lost (Bowler 1989; Riparian Habitat Joint Venture 2009). Using 2002 land cover data from CalFire, the Riparian Habitat Joint Venture estimated that riparian vegetation makes up less than 0.5% of California's total land area at about 360,000 acres (Riparian Habitat Joint Venture 2004). This is alarming because riparian habitats perform a number of biological and physical functions that benefit wildlife, plants, and humans, and loss of what little is left will have severe, harmful impacts on special-status species, overall biodiversity, and ecosystem function. California cannot afford to lose more riparian corridors.

A literature review found that recommended buffers for wildlife often far exceeded 100 meters (~325 feet), well beyond the largest buffers implemented in practice (Robins 2002). For example, Kilgo et al. (1998) recommend more than 1,600 feet of riparian buffer to sustain bird

diversity. In addition, amphibians, which are considered environmental health indicators, have been found to migrate over 1,000 feet between aquatic and terrestrial habitats through multiple life stages (Semlitsch and Bodie 2003; Trenham and Shaffer 2005; Cushman 2006; Fellers and Kleeman 2007). Accommodating the more long-range dispersers is vital for continued survival of species populations and/or recolonization following a local extinction (Semlitsch and Bodie 2003; Cushman 2006). In addition, more extensive buffers provide resiliency in the face of climate change-driven alterations to these habitats, which will cause shifts in species ranges and distributions (Cushman et al., 2013; Heller & Zavaleta, 2009; Warren et al., 2011). This emphasizes the need for sizeable riparian and upland buffers around streams and wetlands in and adjacent to the Project area, as well as connectivity corridors between heterogeneous habitats. Again, the EIR must adequately assess and mitigate impacts to local, regional, and global wildlife movement and habitat connectivity.

It is widely recognized that the continuing fragmentation of habitat by humans threatens biodiversity and diminishes our (humans, plants, and animals) ability to adapt to climate change. In a report for the International Union for Conservation of Nature (IUCN), world-renown scientists from around the world stated that "[s]cience overwhelmingly shows that interconnected protected areas and other areas for biological diversity conservation are much more effective than disconnected areas in human-dominated systems, especially in the face of climate change" and "[i]t is imperative that the world moves toward a coherent global approach for ecological connectivity conservation, and begins to measure and monitor the effectiveness of efforts to protect connectivity and thereby achieve functional ecological networks" (Hilty et al. 2020).

Given the potential for the Project to fragment and remove contiguous high quality habitat in a linkage that is important for wildlife movement, the Center urges the City to consider the alternative proposed by the Santa Monica Mountains Conservancy (SMMC) in its letter of January 11, 2021 that would reduce the scale and the footprint of the project. In addition, the Center urges the adoption of mitigation measures that address the needs of multiple target species in the area that would be impacted. Measures that minimize lighting, noise, pesticide use, and the establishment of invasive plants, particularly in areas adjacent to protected open space, should be implemented. And given that the Project area is adjacent to the Bel Air Crest Road undercrossing under the 405 freeway (one of the last, if not the last, viable undercrossings in the linkage) and would likely increase traffic in the area, wildlife crossings and associated infrastructure on new or existing roads should be designed and implemented to accommodate the different behaviors and needs of the various target species in the area. For example, smaller species with poor dispersal abilities, like rodents and herpetofauna, would require more frequent intervals of crossings on roads compared to larger wide-ranging species, like mountain lions or coyotes, to increase their chances of finding a crossing. Gunson et al. (2016) recommend that crossing structures generally be spaced about 300m (~0.19mi) apart for small animals when transportation infrastructure bisects large expanses of continuous habitat, though they recognize that some amphibians may need more frequent crossings no more than 50m (~0.03mi) apart. And for many amphibian and reptile species, undercrossings should have grated tops so that the light and moisture inside the crossings are similar to that of the ambient environment. Therefore, multiple crossings designed for different target species may be required on new or existing roads.

In-depth analyses that include on-the-ground movement studies of which species are moving in the area and their home range area, habitat use, and patterns of movement are needed to determine how to best implement such crossings. In addition, associated crossing infrastructure (*e.g.*, exclusionary fencing appropriate for target species, berms to buffer crossings from sound and light) should be included to improve chances of wildlife using crossings, and such crossings and associated infrastructure should be designed and built in consultation with local and regional experts, including agency biologists. And to improve the effectiveness of any wildlife crossings, there should be protected habitat on both sides of the crossing; therefore, mitigation should also include acquiring unprotected lands on both sides of the roads where a wildlife crossing would be implemented, again, in consultation with local conservation organizations and stakeholders, and preserving and managing those lands in perpetuity to ensure that the wildlife crossings and associated infrastructure remain functional over time. Given that impacts of noise, light, and vibration can affect the use of wildlife crossings, even if crossings are designed with adequate parameters and fencing, the crossings should be built with wildlife responsive design; crossings should have sound and light berms to minimize light and sound at the entrance/exit as well as on/in/under the crossings structures, and they should be well-maintained on both sides of the crossing for animals to use them (Shilling 2020; Vickers 2020).

II. *The Project as proposed may harm struggling local mountain lions and other native animals and plants*

The EIR must adequately assess and mitigate Project impacts to mountain lions (*Puma concolor*), candidate species under the California Endangered Species Act (CESA). There is ample scientific evidence that indicates mountain lion populations in Southern California and along the Central Coast are imperiled and that human activities and land use planning that does not integrate adequate habitat connectivity can have adverse impacts on mountain lions. Continued habitat loss and fragmentation has led to 10 genetically isolated populations within California (Gustafson et al. 2018). There are six identified mountain lion populations in the Southern California and Central Coast Evolutionarily Significant Unit ("ESU"), and several are facing an extinction vortex due to high levels of inbreeding, low genetic diversity, high human-caused mortality rates from car strikes on roads, depredation kills, rodenticide poisoning, poaching, disease, and increased human-caused wildfires (Ernest et al. 2003; Ernest et al. 2014; Riley et al. 2014; Vickers et al. 2015; Benson et al. 2016a; Gustafson et al. 2018; Benson et al. 2019).

The effective population sizes of the six populations within the ESU range from 4 to 56.6 (Gustafson et al. 2018; Benson et al. 2019). An effective population size (N_e) of 50 is assumed to be sufficient to prevent inbreeding depression over five generations, while an effective population size of 500 is considered sufficient to retain evolutionary potential in perpetuity (Traill et al. 2010; Frankham et al. 2014). Five of the six populations are well below that minimum threshold of 50 and none have an effective population size anywhere near 500, which indicates that these populations are at serious risk of becoming extirpated. Low genetic diversity and high human-caused mortalities are driving local mountain lions in the Santa Monica mountains towards an extinction vortex (Gustafson et al. 2018). Scientists predict that the Santa Monica and Santa Ana populations, with estimated effective population sizes of 6 and 4, respectively, are likely to become extinct within 50 years if inbreeding depression occurs and

gene flow with other mountain lion populations is not improved (Benson et al. 2016a; Gustafson et al. 2018; Benson et al. 2019). This is detailed in the Center's petition to the California Fish and Game Commission to protect Southern California and Central Coast mountain lions under the California Endangered Species Act (Yap et al. 2019).

The Project as proposed would have significant impacts on struggling local mountain lions. Local mountain lions are at risk of extinction as their genetic health deteriorates and abnormalities linked with inbreeding depression were recently observed.[1] Should inbreeding depression occur, scientists predict there is a >99% chance of extinction, which could occur within as little as 15 years (Benson et al. 2019). Therefore, high quality habitat that is being used by mountain lions in and near the only viable freeway undercrossing (at Bel Air Crest Road) that connects Topanga State Park to the eastern portion of the Santa Monica Mountains (including Griffith Park) is important for the population's long-term survival.

There is a wealth of data from the National Park Service (NPS) that demonstrates their presence in and adjacent to the Project area. Maps of the NPS data are publicly available at www.flickr.com, and they clearly show that the area is used by mountain lions. Figure 1 shows NPS telemetry locations for lions P-1 through P-22 from 2002 to 2013 (from GPS collars on individuals), and numerous individuals were documented in and adjacent to the Project site. Similarly, Figure 2 shows the home ranges of several mountain lions encompassing the Project area. Figure 3 shows predation sites where collared mountain lions fed on mule deer, some of which are located in and adjacent to the Project area (Benson et al. 2016b).

Numerous studies highlight the impacts of human activities on mountain lions. For example, Shilling et al. (2019) reported 299 observed roadkill mountain lions throughout the state from 2015 to 2018, but these deaths are likely underreported. CDFW biologist Justin Dellinger estimates there could be 200 puma deaths on roads every year (Price 2020). And a recent UC Davis special report identified a 58% reduction in mountain lion road mortalities after a 71% decrease in road use due to COVID-19 pandemic "stay-at-home" orders (Nguyen et al. 2020). This report highlights how roads and traffic are deadly barriers to puma movement and gene flow.

[1] News Release: NPS Biologists Report First Abnormalities Linked to Inbreeding Depression in Mountain Lions P-81, a Subadult Male, Has Reproductive and Tail Defects. Available at: https://www.nps.gov/samo/learn/news/first-abnormalities-linked-to-inbreeding-depression.htm

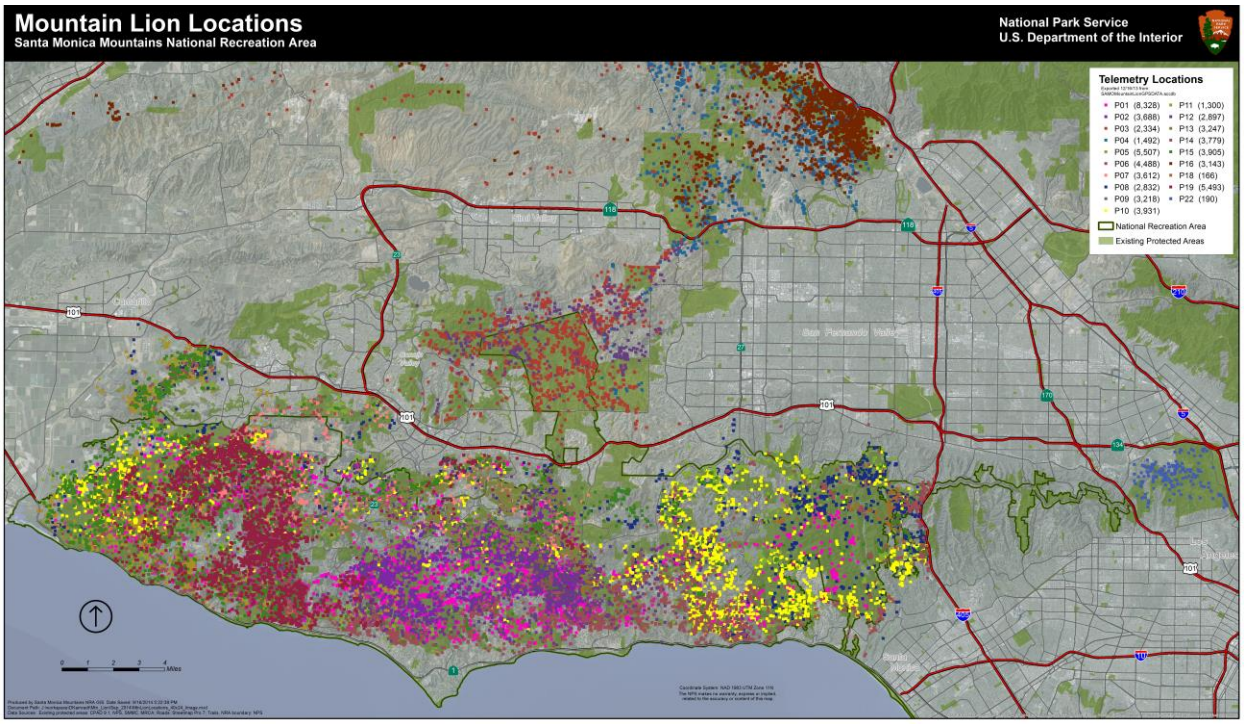

Figure 1: Mountain Lion GPS Data Points of lions P-1 through P-22 from 2002 through 2013 (NPS 2015).

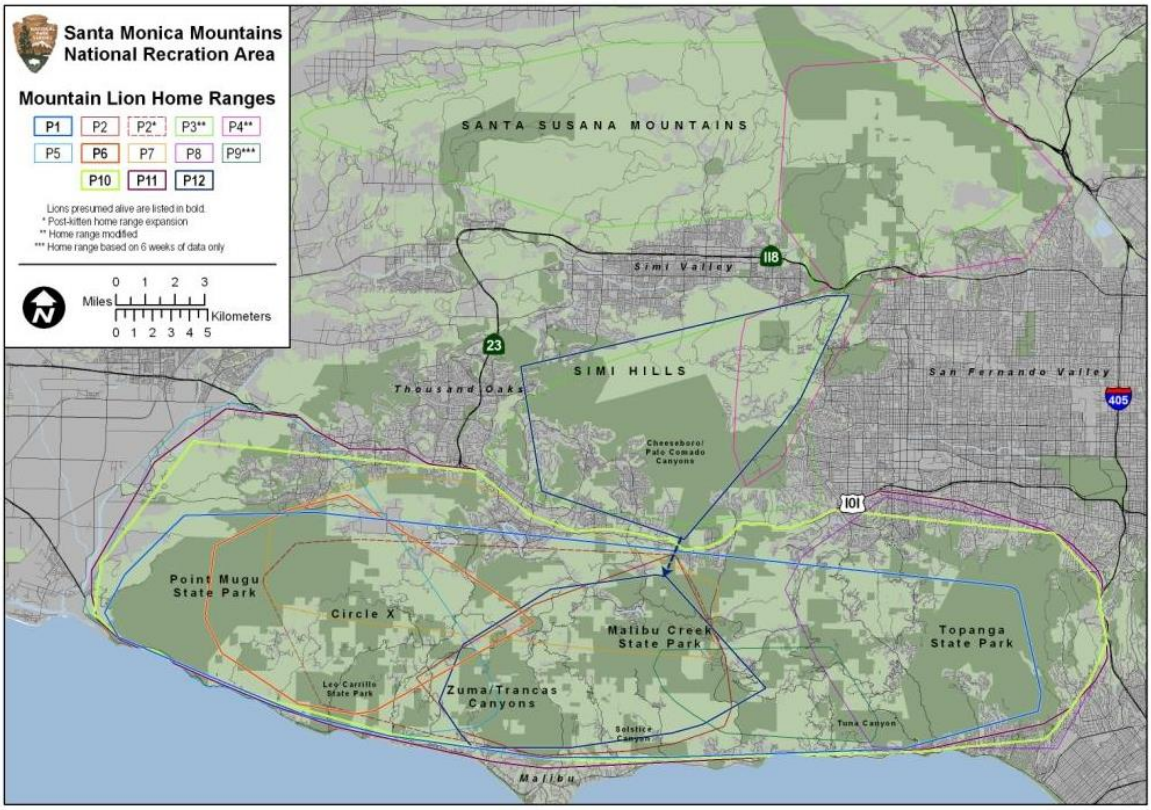

Figure 2: Home Range Map for Lions P-1 through P-12 (NPS 2013).

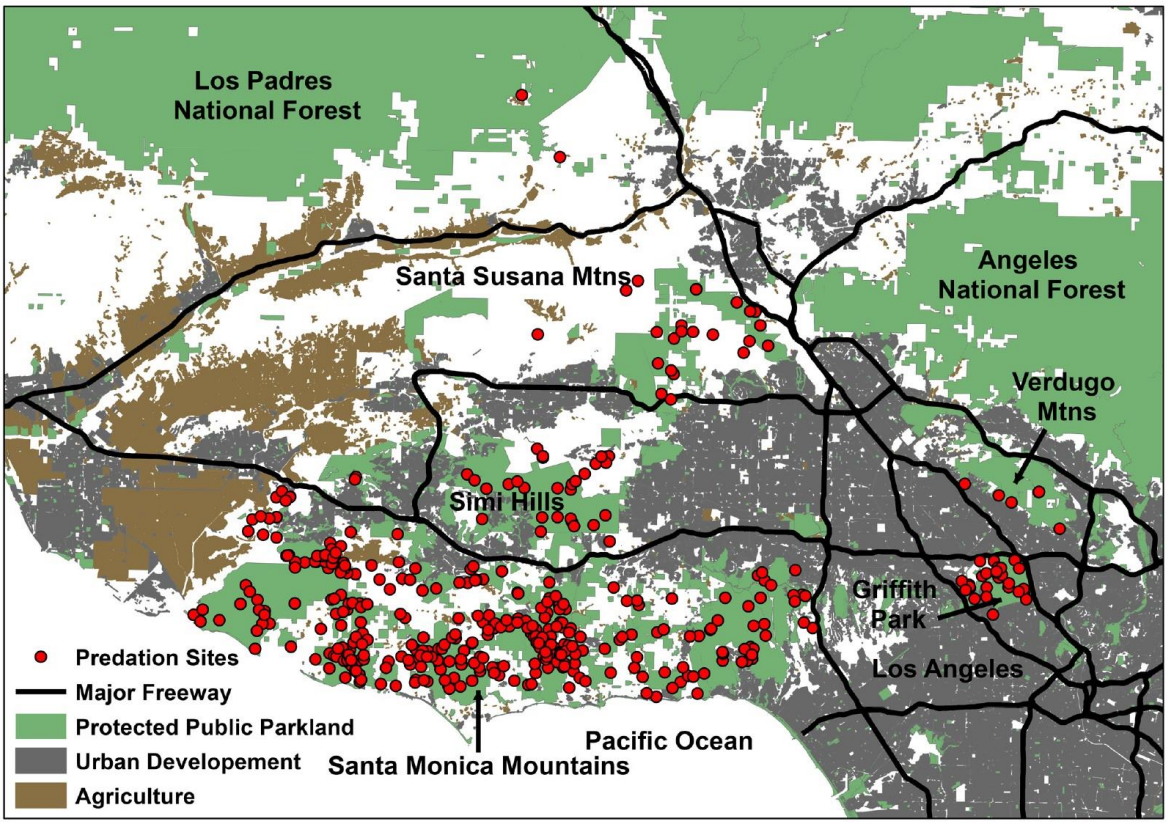

Figure 3: Predation sites where mountain lions fed on mule deer (Benson et al. 2016b).

In addition to causing direct mortality in pumas, human activities also alter these large carnivores' behavior in ways that likely further impede important movement and gene flow. For example, Smith et al. (2017) found that mountain lions are so fearful of humans and noise generated by humans that they will abandon the carcass of a deer and forgo the feeding opportunity just to avoid humans.[2] The study concluded that even "non-consumptive forms of human disturbance may alter the ecological role of large carnivores by affecting the link between these top predators and their prey" (Smith et al. 2017). In addition, mountain lions have been found to respond fearfully upon hearing human vocalizations, avoiding the area and moving more cautiously when hearing humans (Smith et al. 2017; Suraci et al. 2019).

Other studies have demonstrated that mountain lion behavior is impacted when exposed to other evidence of human presence, such as lighting or vehicles/traffic (Wilmers et al. 2013; Smith et al. 2015; Wang et al. 2017). In addition, preliminary results from study by researchers at UC Davis and University of Southern California, as well as those by other researchers, suggest that the light, noise, and other aspects of highways can have negative impacts on wildlife numbers and diversity near the highways (Shilling 2020; Vickers 2020). The researchers found a significant difference between species richness and species type (mammals, including mountain lions), with lower richness and fewer species at crossing structures compared to background

[2] *See also* Sean Greene, "How a fear of humans affects the lives of California's mountain lions," *Los Angeles Times* (June 27, 2017), available at http://beta.latimes.com/science/sciencenow/la-sci-sn-pumas-human-noise-20170627-story.html.

areas 1 km away from the roads (Shilling 2020). They also found that as traffic noises surpassed 60 dBC, the number of visits by small to large mammals decreased and most of the species in their study avoid traffic noise (Shilling 2020). It is clear that different species have variable sensitivities to noise and light associated with development and transportation infrastructure; this can lead to changes in species distributions near roads and development, which can have ecosystem-level impacts (e.g., Suraci et al. 2019). Thus, roads, traffic, and development have negative impacts on puma survival and behavior, which can reduce the genetic health of populations and ultimately diminish their chances of long-term survival.

Yovovich et al. (2020) further documented the impacts of human activities on mountain lions in the Santa Cruz Mountains, specifically on communication and reproductive behaviors important for their survival. Males use scrapes to delineate territories as well as attract potential mates (Allen et al. 2015; Allen et al. 2016), and the males in the study preferred to use relatively flat areas away from human influence as scrape habitat (Yovovich et al. 2020). Similarly, when nursing females (with kittens less than 8 weeks old) shrank their home ranges to an average of 9 km^2 while their young were most vulnerable, they also selected undeveloped lands away from human disturbance, opting for habitat with protective cover and sufficient water and prey availability (Yovovich et al. 2020). The loss of adequate undisturbed communication and nursery habitat could disrupt important communication and reproductive behaviors that facilitate social structure and overall survival. The authors predicted that future development within the Santa Cruz Mountains could reduce nursery and communication habitat by 20% and 50%, respectively, while further fragmenting the landscape. Such patterns likely extend to other regions within the proposed Southern California/Central Coast ESU.

The Project would place more people and infrastructure and more human activity in high fire-prone areas, which would increase wildfire risk and threaten humans and nearby neighborhoods as well as mountain lions. Although mountain lions are highly mobile and generally able to move away from wildfires, in severe weather conditions wind-driven fires can spread quickly. The 2018 Hill Fire in Ventura County spread three miles in 15 minutes (County of Los Angeles 2019). If mountain lion movement is constrained by roads and development and the lions are unable to access escape routes, then their chances of surviving wildfires are greatly reduced. Two NPS-collared mountain lions, P-64 and P-74, were killed in the 2018 Woolsey Fire. Such stochastic events (*e.g.*, wildfires, flooding) could destabilize small mountain lion populations and make them more vulnerable to extinction (Benson et al. 2016a; Benson et al. 2019).

There are numerous scientific studies that provide insights on the profound impacts human activities and infrastructure have on mountain lion survival, and they emphasize the need to adequately assess and mitigate impacts to these CESA candidate species in the Project area. These studies add to the accumulating evidence that mountain lions require a habitat mosaic that provides sufficient room to roam away from human-disturbed areas and connected to expansive, intact, heterogeneous habitats (Beier et al. 1995; Dickson and Beier 2002; Dickson et al. 2005; Kertson et al. 2011; Zeller et al. 2017). Continued construction of roads and development in mountain lion habitat with little regard for their movement and behavioral needs has direct and indirect lethal and sublethal impacts that threaten the persistence of Southern California and Central Coast puma populations.

Mountain lions are a key indicator species of wildlife connectivity and healthy ecosystems. As the last remaining wide-ranging large carnivore in the region, the ability to move through large swaths of interconnected habitat is vital for genetic connectivity and their long-term survival. Local extinction of mountain lions in the region could have severe ecological consequences. Many scavengers, including many raptors, foxes, and numerous insects, would lose a reliable food source (Ruth and Elbroch 2014; Elbroch et al. 2017; Barry et al. 2019). Fish, birds, amphibians, reptiles, rare native plants, and butterflies could potentially diminish if this apex predator were lost (Ripple and Beschta 2006; Ripple and Beschta 2008; Ripple et al. 2014). Loss of this ecosystem engineer and important predator-prey dynamics could have cascading effects on other plant and animal species, potentially leading to a decrease in biodiversity and diminished overall ecosystem function (Ripple et al. 2014; Elbroch et al. 2017; Barry et al. 2019; Benson et al. 2020b).

The Project as proposed could further harm the already-imperiled Santa Monica Mountains puma population by imposing additional barriers on connectivity, destroying habitat, and increasing noise, traffic, and human disturbance. Again we urge the City to consider the alternative proposed by the SMMC that would reduce the scale and footprint of the Project and implement effective mitigation measures that would minimize impacts to mountain lions and mountain lion connectivity. Wildlife crossings and associated infrastructure on new and existing roads, shielded lighting and noise, especially in developed areas adjacent to open space, and prohibiting pesticide and rodenticide use are a few examples of measures that would reduce impacts to mountain lions.

III. The Project as proposed would increase wildfire risk and endanger nearby residents

Continued development in California's highly fire-prone Mediterranean shrublands and grasslands results in the continual release of large amounts of carbon into the atmosphere by removing significant carbon sinks, increasing wildfire frequency, and degrading habitats and ecosystem function. The past few decades have seen significant growth near natural areas in California's wildland urban interface (*i.e.*, the transition zone between human development and wildlands), including more than one million homes built between 1990 and 2010 (Radeloff et al. 2018). And scientists project that at least 640,000 to 1.2 million new homes will be built in the state's highest wildfire risk areas by 2050 under current land use practices (Mann et al. 2014). In addition, rampant fire suppression and logging since European colonization have led to an increase in wildfire intensity and spread when fires ignite, which leads to compounding carbon release events (Bradley et al. 2016; Morrison 2019; Hanson 2020).

Almost all (95-97%) wildfires in California's Mediterranean regions are caused by humans or human infrastructure in the wildland urban interface (Syphard et al. 2007; Balch et al. 2017; Keeley and Syphard 2018; Radeloff et al. 2018; Syphard and Keeley 2019; Keeley and Syphard 2020; Syphard and Keeley 2020). For example, the 2019 Kincade Fire, 2018 Camp and Woolsey fires, and 2017 Tubbs and Thomas fires were sparked by powerlines or electrical equipment. And although many of the 2020 fires were sparked by a lightning storm, the Apple Fire was caused by sparks from a vehicle, the El Dorado Fire was caused by pyrotechnics at a gender-reveal party, the Blue Ridge Fire was likely caused by a house fire, and electrical

equipment is suspected to have ignited the Silverado and Zogg fires. In the Santa Monica Mountains, fires from 1978-2017 were often ignited near roads and other human infrastructure, including the 405 freeway just east of the Project area (Figure 4). Expanding development in high fire-prone areas leads to increased risk of human ignitions while placing more people in harm's way when fires ignite (Keeley and Syphard 2019).

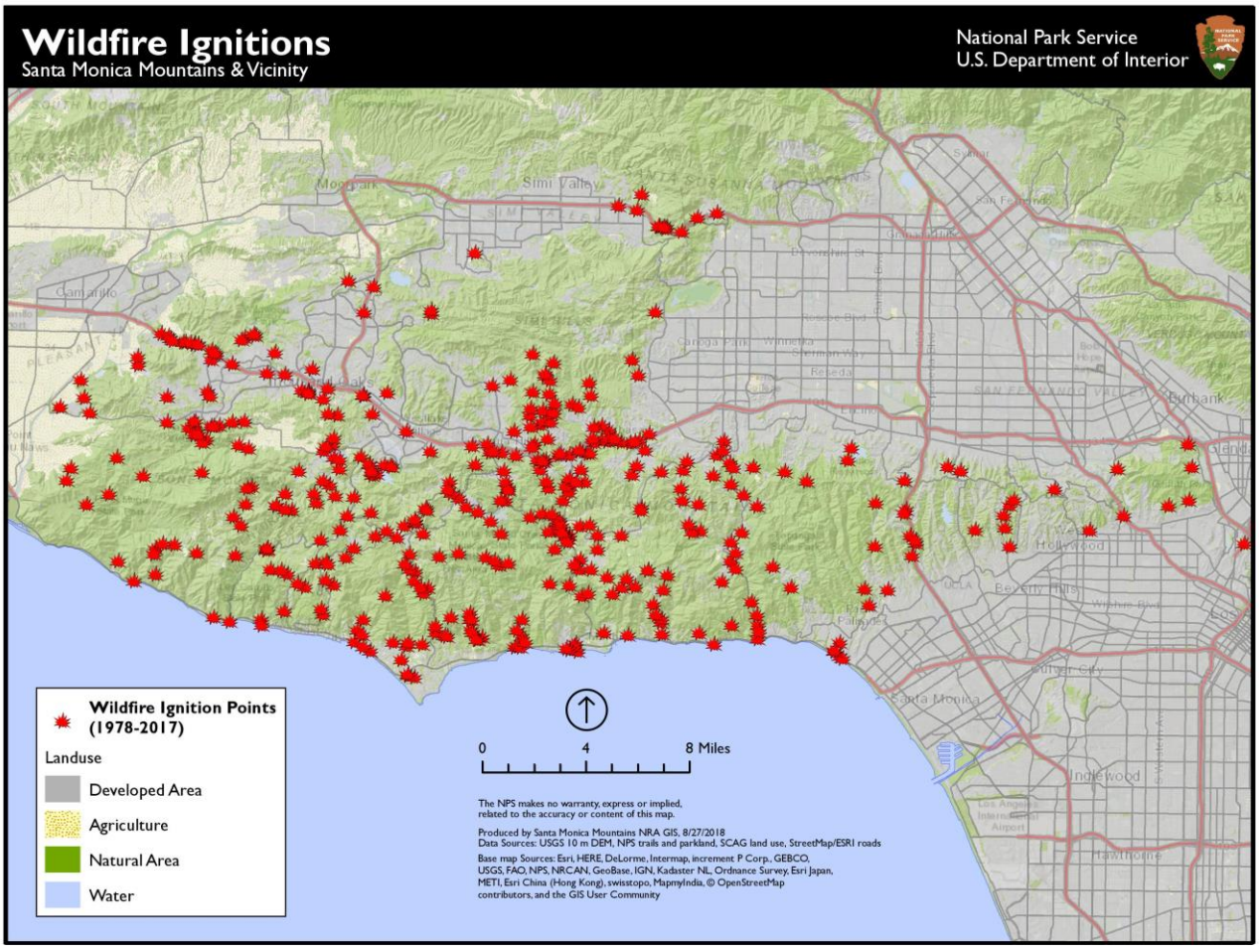

Figure 4: Wildfire Ignition Points in the Santa Monica Mountains and Vicinity (NPS 2018).

Progressively hotter, drier, and windier conditions and more extreme weather events due to climate change are making it easier for wildfires to ignite and spread. The number of days with extreme fire weather conditions in California has doubled since 1980, and further climate change will amplify that trend (Goss et al. 2020). Although wildfires are a natural and necessary process in California's landscapes and much of the state's diverse shrubland communities in its Mediterranean ecosystems are adapted to a high severity infrequent wildfire regime, increases in fire frequency in these systems disrupt the historical fire regimes they have evolved with. This can lead to the establishment of more flammable non-native grasses that increase fire threat over time (Keeley 2005; Keeley 2006; Syphard et al. 2009; Safford and Van de Water 2014; Syphard et al. 2018; Syphard et al. 2019). Other disturbance and associated edge effects from roads and development, such as nitrogen deposition from vehicle emissions, can also lead to the establishment of such invasive grasses (Keeley et al. 2011) as well as reduced native biodiversity (Hernández et al. 2016). Thus, continued development in fire-prone wildlands has the potential

to perpetuate a feedback loop of increased carbon release and wildfire that fuels climate change while eliminating and degrading California's Mediterranean native ecosystems. Southern California is especially vulnerable with development pressures to extend the wildland urban interface into adjacent high fire-prone shrublands. The Project as proposed could increase the risk of wildfire and contribute to this negative feedback loop.

IV. Conclusion

We are in the midst of a global extinction crisis, with species going extinct at a rate of over 1,000 times the background rate and more than one million species on track to become extinct over the coming decades. The City Council should work to safeguard L.A.'s biodiversity and remaining wildlife habitat. Because the Project could further degrade connectivity for already-imperiled mountain lions and increase wildfire risk, we ask the City Council to consider a Project alternative that reduces the scale and footprint of the Project and implements effective mitigation measures to minimize impacts to mountain lions, wildlife connectivity, habitat loss, and wildfire risk.

Thank you for the opportunity to submit comments on the Project. Please include the Center on your notice list for all future updates to the Project and do not hesitate to contact the Center with any questions at the email addresses listed below.

Sincerely,

J.P. Rose
Staff Attorney
Center for Biological Diversity
660 S. Figueroa Street, Suite 1000
Los Angeles, California 90017
jrose@biologicaldiversity.org

Tiffany Yap, D.Env/PhD
Senior Scientist, Wildlife Corridor Advocate
Center for Biological Diversity
1212 Broadway, Suite 800
Oakland, California 94612
tyap@biologicaldiversity.org

cc:
Council Members:
Joe Buscaino, councilmember.buscaino@lacity.org
Bob Blumenfield, councilmember.blumenfield@lacity.org
Mike Bonin, councilmember.bonin@lacity.org
Gil Cedillo, gilbert.Cedillo@lacity.org
Marqueece Harris-Dawson, councilmember.harris-dawson@lacity.org
Paul Krekorian, councilmember.Krekorian@lacity.org
Paul Koretz, paul.koretz@lacity.org
John Lee, councilmember.lee@lacity.org
Nury Martinez, councilmember.martinez@lacity.org
Mitch O'Farrell, councilmember.ofarrell@lacity.org
Curren Price; councilmember.price@lacity.org
Monica Rodriguez, councilmember.rodriguez@lacity.org
Nithya Raman, contactCD4@lacity.org
Herb Wesson, councilmember.wesson@lacity.org
Mike Shull, General Manager of the Department of Recreation and Parks
Michael.A.Shull@lacity.org
Eduardo Soriano Hewitt, District 14 Chief of Staff, Eduardo.Soriano.Hewitt@lacity.org

References
(*Provided via OneDrive*)

Aguilar, R., Quesada, M., Ashworth, L., Herrerias-Diego, Y., & Lobo, J. (2008). Genetic consequences of habitat fragmentation in plant populations: Susceptible signals in plant traits and methodological approaches. *Molecular Ecology*, *17*, 5177–5188.

Allen, M. L., Wittmer, H. U., Houghtaling, P., Smith, J., Elbroch, L. M., & Wilmers, C. C. (2015). The role of scent marking in mate selection by female pumas (Puma concolor). *PLoS ONE*, *10*.

Allen, M. L., Yovovich, V., & Wilmers, C. C. (2016). Evaluating the responses of a territorial solitary carnivore to potential mates and competitors. *Scientific Reports*, *6*.

Austreng, A. C. (2012). *The carbon budget impact of sagebrush degradation*. *Master's Thesis*. Boise state University.

Balch, J. K., Bradley, B. A., Abatzoglou, J. T., Nagy, R. C., Fusco, E. J., & Mahood, A. L. (2017). Human-started wildfires expand the fire niche across the United States. *Proceedings of the National Academy of Sciences*, *114*(11), 2946–2951.

Barry, J. M., Elbroch, L. M., Aiello-lammens, M. E., Sarno, R. J., Seelye, L., Kusler, A., & Quigley, H. B. (2019). Pumas as ecosystem engineers: ungulate carcasses support beetle assemblages in the Greater Yellowstone Ecosystem. *Oecologia*, (189), 577–586.

Beier, P., Choate, D., & Barrett, R. H. (1995). Movement patterns of mountain lions during different behaviors. *Journal of Mammalogy*, *76*(4), 1056–1070.

Benítez-López, A., Alkemade, R., & Verweij, P. A. (2010). The impacts of roads and other infrastructure on mammal and bird populations: A meta-analysis. *Biological Conservation*, *143*, 1307–1316.

Benson, J. F., Mahoney, P. J., Sikich, J. A., Serieys, L. E. K., Pollinger, J. P., Ernest, H. B., & Riley, S. P. D. (2016). Interactions between demography, genetics, and landscape connectivity increase extinction probability for a small population of large carnivores in a major metropolitan area. *Proceedings of the Royal Society B: Biological Sciences*, *283*(1837), 20160957.

Benson, J. F., Mahoney, P. J., Vickers, T. W., Sikich, J. A., Beier, P., Riley, S. P. D., … Boyce, W. M. (2019). Extinction vortex dynamics of top predators isolated by urbanization. *Ecological Applications*, *29*(3), e01868.

Benson, J. F., Mahoney, P. J., Vickers, T. W., Sikich, J. A., Beier, P., Riley, S. P. D., … Boyce, W. M. (2020). Conserving ecological roles of top predators in isolated mountains. *Ecological Applications*, *30*(1), e02029.

Benson, J. F., Sikich, J. A., & Riley, S. P. D. (2016). Individual and population level resource selection patterns of mountain lions preying on mule deer along an urban-wildland gradient. *PLoS ONE*, *11*(7), 1–16.

Bohlman, G. N., Underwood, E. C., & Safford, H. D. (2018). Estimating Biomass in California's Chaparral and Coastal Sage Scrub Shrublands. *Madroño*, *65*(1), 28–46.

Bowler, P. A. (1989). Riparian woodland: An endangered habitat in southern California. *Proceedings of the 15th Annual Symposium Southern California Botanists*, *3*, 80–97.

Bradley, C. M., Hanson, C. T., & DellaSala, D. A. (2016). Does increased forest protection correspond to higher fire severity in frequent-fire forests of the western United States? *Ecosphere*, *7*(10), e01492.

Brehme, C. S., Hathaway, S. A., & Fisher, R. N. (2018). An objective road risk assessment method for multiple species: ranking 166 reptiles and amphibians in California. *Landscape Ecology*, *33*, 911–935.

Brehme, C. S., Tracey, J. A., Clenaghan, L. R. M. C., & Fisher, R. N. (2013). Permeability of roads to movement of scrubland lizards and small mammals. *Conservation Biology*, *27*(4), 710–720.

Cahill, A. E., Aiello-Lammens, M. E., Fisher-Reid, M. C., Hua, X., Karanewsky, C. J., Ryu, H. Y., … Wiens, J. J. (2012). How does climate change cause extinction? *Proceedings of the Royal Society B: Biological Sciences*, *280*, 20121890.

Ceia-Hasse, A., Navarro, L. M., Borda-de-Água, L., & Pereira, H. M. (2018). Population persistence in landscapes fragmented by roads: Disentangling isolation, mortality, and the effect of dispersal. *Ecological Modelling*, *375*, 45–53.

Chen, I.-C., Hill, J. K., Ohlemüller, R., Roy, D. B., & Thomas, C. D. (2011). Rapid range shifts of species associated with high levels of climate warming. *Science*, *333*, 1024–1026.

County of Los Angeles. (2019). *After Action Review of the Woolsey Fire*. *After Action Review of the Woolsey Fire*.

Crooks, K. R. (2002). Relative sensitivities of mammalian carnivores to habitat fragmentation. *Conservation Biology*, *16*(2), 488–502.

Cushman, S. A. (2006). Effects of habitat loss and fragmentation on amphibians: A review and prospectus. *Biological Conservation*, *128*, 231–240.

Cushman, S. A., McRae, B., Adriaensen, F., Beier, P., Shirley, M., & Zeller, K. (2013). Biological corridors and connectivity. In D. W. Macdonald & K. J. Willis (Eds.), *Key Topics in Conservation Biology 2* (First Edit, pp. 384–403). John Wiley & Sons, Ltd.

Damschen, E. I., Brudvig, L. A., Burt, M. A., Jr, R. J. F., Haddad, N. M., Levey, D. J., … Tewksbury, J. J. (2019). Ongoing accumulation of plant diversity through habitat connectivity in an 18-year experiment. *Science*, *365*(6460), 1478–1480.

Delaney, K. S., Riley, S. P. D., & Fisher, R. N. (2010). A rapid, strong, and convergent genetic response to urban habitat fragmentation in four divergent and widespread vertebrates. *PLoS ONE*, *5*(9), 1–11.

Dickson, B. G., & Beier, P. (2002). Home-range and habitat selection by adult cougars in Southern California. *The Journal of Wildlife Management*, *66*(4), 1235–1245.

Dickson, B. G., Jennes, J. S., & Beier, P. (2005). Influence of Vegetation, Topography, and Roads on Cougar Movement in Southern California. *Journal of Wildlife Management*, *69*(1), 264–276.

Elbroch, L. M., O'Malley, C., Peziol, M., & Quigley, H. B. (2017). Vertebrate diversity benefiting from carrion provided by pumas and other subordinate, apex felids. *Biological Conservation*, *215*, 123–131.

Environmental Law Institute. (2003). *Conservation thresholds for land use planners*. *Environmental Law*.

Ernest, H. B., Boyce, W. M., Bleich, V. C., May, B., Stiver, S. J., & Torres, S. G. (2003). Genetic structure of mountain lion (Puma concolor) populations in California. *Conservation Genetics*, (4), 353–366.

Ernest, H. B., Vickers, T. W., Morrison, S. A., Buchalski, M. R., & Boyce, W. M. (2014). Fractured genetic connectivity threatens a Southern California puma (Puma concolor) population. *PLoS ONE*, *9*(10).

Fellers, G. M. and, & Kleeman, P. M. (2007). California Red-Legged Frog (Rana draytonii)

Movement and Habitat Use : Implications for Conservation. *Journal of Herpetology*, *41*(2), 276–286.
Frankham, R., Bradshaw, C. J. A., & Brook, B. W. (2014). Genetics in conservation management: Revised recommendations for the 50/500 rules, Red List criteria and population viability analyses. *Biological Conservation*, *170*, 56–63.
Goss, M., Swain, D. L., Abatzoglou, J. T., Sarhadi, A., Kolden, C. A., Williams, A. P., & Diffenbaugh, N. S. (2020). Climate change is increasing the likelihood of extreme autumn wildfire conditions across California. *Environmental Research Letters*, *15*.
Goverde, M., Schweizer, K., Baur, B., & Erhardt, A. (2002). Small-scale habitat fragmentation effects on pollinator behaviour: Experimental evidence from the bumblebee Bombus veteranus on calcareous grasslands. *Biological Conservation*, *104*, 293–299.
Gunson, K., Seburn, D., Kintsch, J., & Crowley, J. (2016). *Best Management Practices for Mitigating the Effects of Roads on Amphibian and Reptile Species at Risk in Ontario*.
Gustafson, K. D., Gagne, R. B., Vickers, T. W., Riley, S. P. D., Wilmers, C. C., Bleich, V. C., … Ernest, H. B. (2018). Genetic source–sink dynamics among naturally structured and anthropogenically fragmented puma populations. *Conservation Genetics*, *20*(2), 215–227.
Haddad, N. M., Brudvig, L. A., Clobert, J., Davies, K. F., Gonzalez, A., Holt, R. D., … Townshend, J. R. (2015). Habitat fragmentation and its lasting impact on Earth's ecosystems. *Science Advances*, *1*(e1500052), 1–9.
Hanson, C. (2020, September 29). Op-Ed: Don't believe self-serving messengers. Logging will not prevent destructive wildfires. *LA Times*.
Heller, N. E., & Zavaleta, E. S. (2009). Biodiversity management in the face of climate change: A review of 22 years of recommendations. *Biological Conservation*, *142*, 14–32.
Hernández, D. L., Vallano, D. M., Zavaleta, E. S., Tzankova, Z., Pasari, J. R., Weiss, S., … Morozumi, C. (2016). Nitrogen Pollution Is Linked to US Listed Species Declines. *BioScience*, *66*(3), 213–222.
Hilty, J. A., & Merenlender, A. M. (2004). Use of Riparian Corridors and Vineyards by Mammalian Predators in Northern California. *Conservation Biology*, *18*(1), 126–135.
Hilty, J., Worboys, G., Keeley, A., Woodley, S., Lausche, B., Locke, H., … Tabor, G. (2020). *Guidance for conserving connectivity through ecological networks and corridors*. *Best Practice Protected Area Guidelines Series No. 30*. Gland, Switzerland.
Jennings, M., & Lewison, R. (2013). *Planning for Connectivity Under Climate Change: Using Bobcat Movement To Assess Landscape Connectivity Across San Diego County's Open Space*.
Jennings, M., & Zeller, K. (2017). *Comprehensive Mmulti-species Connectivity Assessment and Planning for the Highway 67 Region of San Diego County, California*.
Kantola, T., Tracy, J. L., Baum, K. A., Quinn, M. A., & Coulson, R. N. (2019). Spatial risk assessment of eastern monarch butterfly road mortality during autumn migration within the southern corridor. *Biological Conservation*, *231*, 150–160.
Keeley, J. E. (2005). *Fire as a threat to biodiversity in fire-type shrublands*. *Planning for biodiversity: bringing research and management together. USDA Forest Service General Technical Report PSW-GTR-195*.
Keeley, J. E. (2006). Fire management impacts on invasive plants in the western United States. *Conservation Biology*, *20*(2), 375–384. https://doi.org/10.1111/j.1523-1739.2006.00339.x
Keeley, J. E., Franklin, J., & D'Antonio, C. (2011). Fire and Invasive Plants on California Landscapes. In D. McKenzie, C. Miller, & D. A. Falk (Eds.), *The Landscape Ecology of*

Fire. Dordrecht: Springer.
Keeley, J. E., & Syphard, A. D. (2018). Historical patterns of wildfire ignition sources in California ecosystems. *International Journal of Wildland Fire*, *27*(12), 781.
Keeley, J. E., & Syphard, A. D. (2019). Twenty-first century California, USA, wildfires: fuel-dominated vs. wind-dominated fires. *Fire Ecology*, *15*(24).
Keeley, J. E., & Syphard, A. D. (2020). Nexus between wildfire, climate change and population growth in California. *Fremontia*, *47*(2), 18–27.
Kertson, B. N., Spencer, R. D., Marzluff, J. M., Hepinstall-Cymerman, J., & Grue, C. E. (2011). Cougar space use and movements in the wildland — urban landscape of western Washington. *Ecological Applications*, *21*(8), 2866–2881.
Kilgo, J. C., Sargent, R. A., Chapman, B. R., & Miller, K. V. (1998). Effect of stand width and adjacent habitat on breeding bird communities in bottomland hardwoods. *The Journal of Wildlife Management*, *62*(1), 72–83.
Kociolek, A. V., Clevenger, A. P., St. Clair, C. C., & Proppe, D. S. (2011). Effects of Road Networks on Bird Populations. *Conservation Biology*, *25*(2), 241–249.
Kravchenko, A. N., Guber, A. K., Razavi, B. S., Koestel, J., Quigley, M. Y., Robertson, G. P., & Kuzyakov, Y. (2019). Microbial spatial footprint as a driver of soil carbon stabilization. *Nature Communications*, *10*.
Krosby, M., Theobald, D. M., Norheim, R., & Mcrae, B. H. (2018). Identifying riparian climate corridors to inform climate adaptation planning. *PLoS ONE*, *13*(11).
Lee, J. S., Ruell, E. W., Boydston, E. E., Lyren, L. M., Alonso, R. S., Troyer, J. L., … Vandewoude, S. (2012). Gene flow and pathogen transmission among bobcats (Lynx rufus) in a fragmented urban landscape. *Molecular Ecology*, *21*(7), 1617–1631.
Lohse, K. A., Newburn, D. A., Opperman, J. J., & Merenlender, A. M. (2008). Forecasting relative impacts of land use on anadromous fish habitat to guide conservation planning. *Ecological Applications*, *18*(2), 467–482.
Loss, S. R., Will, T., & Marra, P. P. (2014). Estimation of bird-vehicle collision mortality on U.S. roads. *Journal of Wildlife Management*, *78*, 763–771.
Luo, H., Oechel, W. C., Hastings, S. J., Zulueta, R., Qian, Y., & Kwon, H. (2007). Mature semiarid chaparral ecosystems can be a significant sink for atmospheric carbon dioxide. *Global Change Biology*, *13*, 386–396.
Maclean, I. M. D., & Wilson, R. J. (2011). Recent ecological responses to climate change support predictions of high extinction risk. *Proceedings of the National Academy of Sciences*, *108*(30), 12337–12342.
Mann, M. L., Berck, P., Moritz, M. A., Batllori, E., Baldwin, J. G., Gately, C. K., & Cameron, D. R. (2014). Modeling residential development in California from 2000 to 2050: Integrating wildfire risk, wildland and agricultural encroachment. *Land Use Policy*, *41*, 438–452.
Marsh, D. M., & Jaeger, J. A. G. (2015). Direct effects of roads on small animal populations. In *Roads and ecological infrastructure: Concepts and applications for small animals* (pp. 42–56).
Mcrae, B. H., Dickson, B. G., Keitt, T. H., & Shah, V. B. (2008). Using circuit theory to model connectivity in ecology , evolution , and conservation. *Ecology*, *89*(10), 2712–2724.
Mcrae, B. H., Hall, S. A., Beier, P., & Theobald, D. M. (2012). Where to restore ecological connectivity? Detecting barriers and quantifying restoration benefits. *PLoS ONE*, *7*(12), e52604.
Mitsch, W. J., & Wilson, R. F. (1996). Improving the success of wetland creation and restoration

with know-how, time, and self-design. *Ecological Applications*, *6*(1), 16–17.
Morrison, K. (2019). The next (and oldest) frontier for carbon sequestration. *Flora*, *3*(1), 17–35.
Moyle, P. B., Katz, J. V. E., & Quiñones, R. M. (2011). Rapid decline of California's native inland fishes: A status assessment. *Biological Conservation*, *144*, 2414–2423.
Nguyen, T., Saleh, M., Kyaw, M.-K., Trujillo, G., Bejarano, M., Tapia, K., … Shilling, F. (2020). *Special Report 4: Impact of COVID-19 Mitigation on Wildlife-Vehicle Conflict*.
Olson, D. H., & Burnett, K. M. (2013). Geometry of forest landscape connectivity: pathways for persistence. In *Density Management in the 21st Century: West Side Story: Proceedings of the Density Management Workshop, 4-6 October 2011, Corvalllis, Oregon.*
Pacifici, M., Visconti, P., Butchart, S. H. M., Watson, J. E. M., Cassola, F. M., & Rondinini, C. (2017). Species' traits influenced their response to recent climate change. *Nature Climate Change*, *7*(3), 205–208.
Parmesan, C. (2006). Ecological and Evolutionary Responses to Recent Climate Change. *Annual Review of Ecology, Evolution, and Systematics*, *37*, 637–669.
Parmesan, C., & Yohe, G. (2003). A globally coherent fingerprint of climate change ipacts across natural systems. *Nature*, *421*(2), 37–42.
Pinto, N., & Keitt, T. H. (2008). Beyond the least-cost path: Evaluating corridor redundancy using a graph- theoretic approach. *Landscape Ecology*, *24*(2), 253–266.
Price, A. (2020, May 29). How the West is Learning to Live with Mountain Lions. *Bitterroot Magazine*.
Radeloff, V. C., Helmers, D. P., Kramer, H. A., Mockrin, M. H., Alexandre, P. M., Bar-Massada, A., … Stewart, S. I. (2018). Rapid growth of the US wildland-urban interface raises wildfire risk. *Proceedings of the National Academy of Sciences*, *115*(13), 3314–3319.
Riley, S. P. D., Pollinger, J. P., Sauvajot, R. M., York, E. C., Bromley, C., Fuller, T. K., & Wayne, R. K. (2006). A southern California freeway is a physical and social barrier to gene flow in carnivores. *Molecular Ecology*, *15*, 1733–1741.
Riley, S. P. D., Serieys, L. E. K., Pollinger, J. P., Sikich, J. A., Dalbeck, L., Wayne, R. K., & Ernest, H. B. (2014). Individual behaviors dominate the dynamics of an urban mountain lion population isolated by roads. *Current Biology*, *24*(17), 1989–1994.
Riparian Habitat Joint Venture. (2004). *The Riparian Bird Conservation Plan: A strategy for reversing the decline of riparian associated birds in California*.
Riparian Habitat Joint Venture. (2009). *California Riparian Habitat Restoration Handbook*.
Ripple, W. J., & Beschta, R. L. (2006). Linking a cougar decline , trophic cascade , and catastrophic regime shift in Zion National Park. *Biological Conservation*, *133*, 397–408.
Ripple, W. J., & Beschta, R. L. (2008). Trophic cascades involving cougar, mule deer, and black oaks in Yosemite National Park. *Biological Conservation*, *141*, 1249–1256.
Ripple, W. J., Estes, J. A., Beschta, R. L., Wilmers, C. C., Ritchie, E. G., Hebblewhite, M., … Wirsing, A. J. (2014). Status and ecological effects of the world 's largest carnivores. *Science*, *343*(6167), 1241484.
Robins, J. D. (2002). *Stream Setback Technical Memo*.
Root, T. L., Price, J. T., Hall, K. R., Schneider, S. H., Resenzweig, C., & Pounds, J. A. (2003). Fingerprints of global warming on wild animals and plants. *Nature*, *421*, 57–60.
Ruth, T. K., & Elbroch, L. M. (2014). The carcass chronicles : carnivory, nutrient flow, and biodiversity. *Wild Felid Monitor*, 14–19.
Safford, H. D., & Van de Water, K. M. (2014). Using Fire Return Interval Departure (FRID) analysis to map spatial and temporal changes in fire frequency on National Forest lands in

California. *Pacific Southwest Research Station - Research Paper PSW-RP-266*, (January), 1–59. https://doi.org/Res. Pap. PSW-RP-266
Scheffers, B. R., De Meester, L., Bridge, T. C. L., Hoffmann, A. A., Pandolfi, J. M., Corlett, R. T., … Watson, J. E. M. (2016). The broad footprint of climate change from genes to biomes to people. *Science*, *354*(6313).
Semlitsch, R. D., & Bodie, J. R. (2003). Biological criteria for buffer zones around wetlands and riparian habitats for amphibians and reptiles. *Conservation Biology*, *17*(5), 1219–1228.
Shilling, F. (2020). Wildlife Behavior in Response to Traffic Disturbance Wildlife Behavior in Response to Traffic Disturbance.
Shilling, F., Waetjen, D., Harrold, K., & Farman, P. (2019). *2019 Impact of Wildlife-Vehicle Conflict on California Drivers and Animals*.
Slabbekoorn, H., & Ripmeester, E. A. P. (2008). Birdsong and anthropogenic noise: implications and applications for conservation. *Molecular Ecology*, *17*, 72–83.
Smith, J. A., Suraci, J. P., Clinchy, M., Crawford, A., Roberts, D., Zanette, L. Y., & Wilmers, C. C. (2017). Fear of the human 'super predator' reduces feeding time in large carnivores. *Proceedings of the Royal Society B: Biological Sciences*, *284*(1857), 20170433.
Smith, J. A., Wang, Y., & Wilmers, C. C. (2015). Top carnivores increase their kill rates on prey as a response to human-induced fear. *Proceedings of the Royal Society B: Biological Sciences*, *282*(1802).
Soudzilovskaia, N. A., van Bodegom, P. M., Terrer, C., Zelfde, M. van't, McCallum, I., Luke McCormack, M., … Tedersoo, L. (2019). Global mycorrhizal plant distribution linked to terrestrial carbon stocks. *Nature Communications*, *10*, 1–10.
Stillwater Sciences. (2002). *Napa River Basin Limiting Factors Analysis*.
Suraci, J. P., Clinchy, M., Zanette, L. Y., & Wilmers, C. C. (2019). Fear of humans as apex predators has landscape-scale impacts from mountain lions to mice. *Ecology Letters*, *22*(10), 1578–1586.
Syphard, A. D., Brennan, T. J., & Keeley, J. E. (2018). Chaparral Landscape Conversion in Southern California. In *Valuing Chaparral* (pp. 323–346).
Syphard, A. D., Brennan, T. J., & Keeley, J. E. (2019). Drivers of chaparral type conversion to herbaceous vegetation in coastal Southern California. *Diversity and Distributions*, *25*, 90–101.
Syphard, A. D., & Keeley, J. E. (2019). Factors associated with structure loss in the 2013–2018 California wildfires. *Fire*, *2*(3), 49.
Syphard, A. D., & Keeley, J. E. (2020). Why are so many structures burning in California. *Fremontia*, *47*(2), 28–35.
Syphard, A. D., Radeloff, V. C., Hawbaker, T. J., & Stewart, S. I. (2009). Conservation threats due to human-caused increases in fire frequency in mediterranean-climate ecosystems. *Conservation Biology*, *23*(3), 758–769.
Syphard, A. D., Radeloff, V. C., Keeley, J. E., Hawbaker, T. J., Clayton, M. K., Stewart, S. I., … Hammer, R. B. (2007). Human influence on California fire regimes. *Ecological Society of America*, *17*(5), 1388–1402.
Traill, L. W., Brook, B. W., Frankham, R. R., & Bradshaw, C. J. A. (2010). Pragmatic population viability targets in a rapidly changing world. *Biological Conservation*, *143*, 28–34.
Trenham, P. C., & Shaffer, H. B. (2005). Amphibian upland habitat use and its consequences for population viability. *Ecological Applications*, *15*(4), 1158–1168.

Trombulak, S. C., & Frissell, C. A. (2000). Review of ecological effects of roads on terrestrial and aquatic communities. *Conservation Biology*, *14*(1), 18–30.
van der Ree, R., Jaeger, J. A. G., van der Grift, E. A., & Clevenger, A. P. (2011). Effects of roads and traffic on wildlife populations and landscape function: Road ecology is moving toward larger scales. *Ecology and Society*, *16*(1), 48.
Vicente-Serrano, S. M., Gouveia, C., Camarero, J. J., Beguería, S., Trigo, R., López-Moreno, J. I., … Sanchez-Lorenzo, A. (2013). Response of vegetation to drought time-scales across global land biomes. *Proceedings of the National Academy of Sciences of the United States of America*, *110*(1), 52–57.
Vickers, T. W. (2020). Project Title: Santa Ana Mountains to eastern Peninsular Range Conservation Connectivity Infrastructure Planning Project for Interstate 15 and Closely Associated Roadways.
Vickers, T. W., Sanchez, J. N., Johnson, C. K., Morrison, S. A., Botta, R., Smith, T., … Boyce, W. M. (2015). Survival and mortality of pumas (Puma concolor) in a fragmented, urbanizing landscape. *PLoS ONE*, *10*(7), 1–18.
Wang, Y., Smith, J. A., & Wilmers, C. C. (2017). Residential development alters behavior, movement, and energetics in a top carnivore. *PlosOne*, 1–17.
Warren, R., Price, J., Fischlin, A., de la Nava Santos, S., & Midgley, G. (2011). Increasing impacts of climate change upon ecosystems with increasing global mean temperature rise. *Climatic Change*, *106*(2), 141–177.
Wiens, J. J. (2016). Climate-related local extinctions are already widespread among plant and animal species. *PLoS Biology*, *14*(12), 1–18. https://doi.org/10.1371/journal.pbio.2001104
Wilmers, C. C., Wang, Y., Nickel, B., Houghtaling, P., Shakeri, Y., Allen, M. L., … Williams, T. (2013). Scale dependent behavioral responses to human development by a large predator, the puma. *PLoS ONE*, *8*(4).
Yap, T. A., Rose, J. P., & Cummings, B. (2019). *A Petition to List the Southern California/Central Coast Evolutionarily Significant Unit (ESU) of Mountain Lions as Threatened under the California Endangered Species Act (CESA)*.
Yovovich, V., Allen, M. L., Macaulay, L. T., & Wilmers, C. C. (2020). Using spatial characteristics of apex carnivore communication and reproductive behaviors to predict responses to future human development. *Biodiversity and Conservation*, *29*(8), 2589–2603.
Zeller, K. A., Vickers, T. W., Ernest, H. B., & Boyce, W. M. (2017). Multi-level, multi-scale resource selection functions and resistance surfaces for conservation planning: Pumas as a case study. *PLoS ONE*, *12*(6), 1–20.