

Communication from Public

Name: Center for Biological Diversity (J.P. Rose and Tiffany Yap)
Date Submitted: 05/12/2023 03:34 PM
Council File No: 21-0777-S1
Comments for Public Posting: Please see the attached letter supporting the motion.



May 12, 2023

Sent via email

Los Angeles City Council
200 N. Spring Street
Los Angeles, CA 90012
cityclerk@lacity.org

Re: SUPPORT for motion to rescind initiation of a general plan amendment for the Retreat at Benedict Canyon (Council File #21-0777-S1)

Dear Los Angeles City Councilmembers:

These comments are submitted on behalf of the Center for Biological Diversity (the “Center”) regarding Councilmember Katy Yaroslavsky’s motion to rescind the initiation of a general plan amendment for the Retreat at Benedict Canyon Project (“Project”). As discussed in the Center’s comments on the Notice of Preparation (Appendix I), the Project would result in loss of native biodiversity and increased wildfire risk while providing no benefits to City residents. We strongly urge the City Council to focus resources on smart, sustainable planning that preserves existing open space and increases equitable access to nature instead of spending time and money on a project that will harm sensitive wildlife and communities.

Life on Earth is experiencing a sixth mass extinction driven primarily by habitat loss and fragmentation, and climate change is an increasing threat. Combating the extinction and climate crises requires bold action to ensure we protect remaining biodiversity and open space. This not only helps wildlife, but it is essential to building a healthy, climate-resilient future for all Angelenos. Native landscapes help us regulate our climate, purify our air and water, pollinate our crops, and create healthy soil. Continued preservation and increased access will help ensure all Angelenos experience the physical and mental health benefits of nature while bringing the state closer to its commitment to conserve more than 30 percent of its lands and coastal waters by 2030 under executive order N-82-20.

I. Background on the Center

The Center for Biological Diversity 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 Southern California.

II. Habitat Connectivity is Vital for Wildlife Movement, Biodiversity Conservation, and Climate Change Resilience

As highlighted in a 2021 report by the Center, habitat connectivity is vital for wildlife movement, biodiversity conservation, and climate change resilience (Yap, Rose, Anderson, et al., 2021). Restrictions on movement and dispersal (*e.g.*, development, roads, and other human-modified landscapes, including golf courses) can negatively affect animals' behavior, movement patterns, reproductive success, and physiological state, which can lead to significant impacts on plants, individual wildlife, populations, communities, and landscapes (Damschen et al., 2019; Ceia-Hasse et al., 2018; Cushman, 2006; Haddad et al., 2015; Trombulak & Frissell, 2000; van der Ree et al., 2011). 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. In addition, connectivity between high quality habitat areas in heterogeneous landscapes is important to allow for range shifts and species migrations as climate changes (Cushman et al., 2013; Heller & Zavaleta, 2009; Krosby et al., 2018).

In Los Angeles, local mountain lions exemplify the need protect and enhance existing open space. Local mountain lions are often unable to find mates, food, and shelter due to barriers caused by poorly sited development and roads. Southern California mountain lions—including the local Santa Monica Mountains population within the City—are now provisionally listed under the state endangered species act primarily due to loss of habitat connectivity (Yap et al., 2019). Other wildlife are also harmed by habitat loss and fragmentation. Studies have shown that birds, lizards, squirrels, and other sensitive species are declining or otherwise being negatively impacted and biodiversity decreases when habitat islands are formed by poorly planned development (Amburgey et al., 2021; Delaney et al., 2010, 2021; Gray, 2017; Wenner et al., 2022). A large commercial development in this area would threaten the city's remaining biodiversity.

III. Increasing Wildfire Risk Endangers Communities

The science is clear that increased development in high fire-prone wildlands can lead to more human-caused ignitions, as most contemporary wildfires in California are caused by human sources (Yap, Rose, Broderick, et al., 2021). Building new developments in high fire-risk areas increases unintentional ignitions and places more people in danger. Between 2015 and 2020 almost 200 people in the state were killed in wildfires, more than 50,000 structures burned, hundreds of thousands of people had to evacuate their homes and endure power outages, and millions were exposed to unhealthy levels of smoke and air pollution. Meanwhile costs for fire suppression and damages have skyrocketed. Increased human-caused ignitions and the conversion of native habitats to more flammable non-native grasses have led to increased fire activity in the urban wildland interface, which is harmful to numerous wildlife, habitats, and people. In addition, increasing fire frequency due to development is converting chaparral and sage scrub ecosystems into non-native grasses that burn more easily, leading to a dangerous “feedback loop” of increasing fire, degraded habitats, and pollution.

IV. Preserving and Enhancing Remaining Habitat is an Important Nature-Based Solution to Combat Climate Change

California's diverse habitats store and sequester significant amounts of carbon. In addition to trees and woodlands storing and sequestering large amounts of carbon, other habitats like shrublands and grasslands also store and sequester significant amounts of carbon (Bohlman et al., 2018; Carey et al., 2020; Koteen et al., 2011; Quideau et al., 1998; Schrader-Patton & Underwood, 2021). Shrublands and grasslands may also provide resilience to climate change because they have an adaptive capacity to hot and dry weather conditions in water- and nutrient-limited environments (Craine et al., 2013; Dass et al., 2018; Luo et al., 2007; Terrer et al., 2021; Vicente-Serrano et al., 2013),

V. Preservation of and Equitable Access to Open Space Protects Wildlife and Improves Community Well-being

The welfare of humans is deeply linked to nature and access to open space. Equitable access to open space is vital for communities to experience the physical and mental health benefits of nature (Martin et al., 2020). Studies conducted in Southern California have shown that children living closer to open space had fewer asthma emergency department visits (Douglas et al., 2019) and were less likely to experience obesity (Wolch et al., 2011) compared to those living further away from open space. Similarly, residents living closer to urban parks had better mental health scores compared to those living further away (Sturm & Cohen, 2014) and psychological well-being increased with increasing biodiversity in urban green spaces (Wood et al., 2018).

Although there are some trade-offs between housing densification and biodiversity, scientists have found that designing denser neighborhoods with creative green solutions can increase affordable and accessible housing while supporting and enhancing biodiversity (McDonald et al., 2023). Examples of science-based solutions, or green interventions, include preserving remnant habitat patches, protecting riparian corridors, requiring onsite stormwater capture, green roofs, and creating managed urban parks (McDonald et al., 2023). Land-use planning in Los Angeles should incorporate thoughtful solutions to combat the extinction and climate crises.

VI. Conclusion

Once again, the Center supports Councilmember Katy Yaroslavsky's motion to rescind the initiation of a general plan amendment for the Retreat at Benedict Canyon Project ("Project"). We urge the City Council to support this motion and focus resources on smart, sustainable planning that preserves existing open space and increases equitable access to nature, including by adopting a strong wildlife ordinance. Preserving and enhancing remaining habitat and connectivity is critical for the area's rich biodiversity and will bring the state closer to its commitment to conserve more than 30 percent of its lands and coastal waters by 2030 under executive order N-82-20.

Sincerely,



Tiffany Yap, D.Env/PhD
Senior Scientist, Wildlife Connectivity
Advocate
Center for Biological Diversity
Telephone: (510) 847-5838
tyap@biologicaldiversity.org



J.P. Rose
Policy Director & Senior Attorney
Urban Wildlands Program
Center for Biological Diversity
Telephone: (408) 497-7675
jrose@biologicaldiversity.org

References

- Amburgey, S. M., W Miller, D. A., Rochester, C. J., Delaney, K. S., D Riley, S. P., Brehme, C. S., Hathaway, S. A., & Fisher, R. N. (2021). The influence of species life history and distribution characteristics on species responses to habitat fragmentation in an urban landscape. *J Anim Ecol*, 90, 685–697.
- 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.
- Carey, C. J., Weverka, J., DiGaudio, R., Gardali, T., & Porzig, E. L. (2020). Exploring variability in rangeland soil organic carbon stocks across California (USA) using a voluntary monitoring network. *Geoderma Regional*, 22, e00304.
- 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.
- Craine, J. M., Ocheltree, T. W., Nippert, J. B., Towne, E. G., Skibbe, A. M., Kembel, S. W., & Fargione, J. E. (2013). Global diversity of drought tolerance and grassland climate-change resilience. *Nature Climate Change*, 3, 63–67.
- 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., Orrock, J. L., Resasco, J., & Tewksbury, J. J. (2019). Ongoing accumulation of plant diversity through habitat connectivity in an 18-year experiment. *Science*, 365(6460), 1478–1480.
- Dass, P., Houlton, B. Z., Wang, Y., & Warlind, D. (2018). Grasslands may be more reliable carbon sinks than forests in California. *Environmental Research Letters*, 13(0741027).
- Delaney, K. S., Busteed, G., Fisher, R. N., & Riley, S. P. D. (2021). Reptile and Amphibian Diversity and Abundance in an Urban Landscape: Impacts of Fragmentation and the Conservation Value of Small Patches. *Ichthyology and Herpetology*, 109(2), 424–435. <https://doi.org/10.1643/h2019261>
- 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), e12767.
- Douglas, J. A., Archer, R. S., & Alexander, S. E. (2019). Ecological determinants of respiratory health: Examining associations between asthma emergency department visits, diesel particulate matter, and public parks and open space in Los Angeles, California. *Preventive Medicine Reports*, 14, 100855.
- Gray, M. (2017). *The influence of land use and habitat fragmentation on landscape connectivity*. UC Berkeley.
- Haddad, N. M., Brudvig, L. A., Clobert, J., Davies, K. F., Gonzalez, A., Holt, R. D., Lovejoy, T. E., Sexton, J. O., Austin, M. P., Collins, C. D., Cook, W. M., Damschen, E. I., Ewers, R. M., Foster, B. L., Jenkins, C. N., King, A. J., Laurance, W. F., Levey, D. J., Margules, C. R., ... Townshend, J. R. (2015). Habitat fragmentation and its lasting impact on Earth's ecosystems. *Science Advances*, 1(e1500052), 1–9.
- 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.
- Koteen, L. E., Baldocchi, D. D., & Harte, J. (2011). Invasion of non-native grasses causes a drop in soil carbon storage in California grasslands. *Environmental Research Letters*, 6.
- Krosby, M., Theobald, D. M., Norheim, R., & Mcrae, B. H. (2018). Identifying riparian climate corridors to inform climate adaptation planning. *PLoS ONE*, 13(11).
- 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.
- Martin, L., White, M. P., Hunt, A., Richardson, M., Pahl, S., & Burt, J. (2020). Nature contact, nature connectedness and associations with health, wellbeing and pro-environmental behaviours. *Journal of Environmental Psychology*, 68, 101389.
- McDonald, R. I., Aronson, M. F. J., Beatley, T., Beller, E., Bazo, M., Grossinger, R., Jessup, K., Mansur, A. V., Puppim de Oliveira, J. A., Panlasigui, S., Burg, J., Pevzner, N., Shanahan, D., Stoneburner, L., Rudd, A., & Spotswood, E. (2023). Denser and greener cities: Green interventions to achieve both urban density and nature. *People and Nature*, 5, 84–102.
- Quideau, S. A., Graham, R. C., Chadwick, O. A., & Wood, H. B. (1998). Organic carbon sequestration under chaparral and pine after four decades of soil development. *Geoderma*, 83, 227–242. [https://doi.org/10.1016/S0016-7061\(97\)00142-0](https://doi.org/10.1016/S0016-7061(97)00142-0)
- Schrader-Patton, C. C., & Underwood, E. C. (2021). New biomass estimates for chaparral-dominated southern California landscapes. *Remote Sensing*, 13.
- Sturm, R., & Cohen, D. (2014). Proximity to urban parks and mental health. *Journal of Mental Health Policy and Economics*, 17(1), 19–24.
- Terrer, C., Phillips, R. P., Hungate, B. A., Rosende, J., Pett-Ridge, J., Craig, M. E., van Groenigen, K. J., Keenan, T. F., Sulman, B. N., Stocker, B. D., Reich, P. B., Pellegrini, A. F. A., Pendall, E., Zhang, H., Evans, R. D., Carrillo, Y., Fisher, J. B., Van Sundert, K., Vicca, S., & Jackson, R. B. (2021). A trade-off between plant and soil carbon storage under elevated CO₂. *Nature*, 591(7851), 599–603.
- 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. <http://spectrum.library.concordia.ca/974450/>
- Vicente-Serrano, S. M., Gouveia, C., Camarero, J. J., Beguería, S., Trigo, R., López-Moreno, J. I., Azorín-Molina, C., Pasho, E., Lorenzo-Lacruz, J., Revuelto, J., Morán-Tejeda, E., & Sanchez-Lorenzo, A. (2013). Response of vegetation to drought time-scales across global land biomes. *Proceedings of the National Academy of Sciences*, 110(1), 52–57.
- Wenner, S. M., Murphy, M. A., Delaney, K. S., Pauly, G. B., Richmond, J. Q., Fisher, R. N., & Robertson, J. M. (2022). Natural and anthropogenic landscape factors shape functional connectivity of an ecological specialist in urban Southern California. *Molecular Ecology*, 31, 5214–5230.
- Wolch, J., Jerrett, M., Reynolds, K., McConnell, R., Chang, R., Dahmann, N., Brady, K., Gilliland, F., Su, J. G., & Berhane, K. (2011). Childhood obesity and proximity to urban parks and recreational resources: A longitudinal cohort study. *Health and Place*, 17, 207–214.
- Wood, E., Harsant, A., Dallimer, M., de Chavez, A. C., McEachan, R. R. C., & Hassall, C. (2018). Not all green space is created equal: Biodiversity predicts psychological restorative

- benefits from urban green space. *Frontiers in Psychology*, 9, 1–13.
- Yap, T. A., Rose, J. P., Anderson, I., & Prabhala, A. (2021). *California Connections: How Wildlife Connectivity Can Fight Extinction and Protect Public Safety*.
- Yap, T. A., Rose, J. P., Broderick, P., & Prabhala, A. (2021). *Built to Burn: California's Wildlands Developments Are Playing With Fire*.
- 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)*.

Appendix I



December 9, 2020

Sent via email

Jason McCrea
City of Los Angeles
Department of City Planning
221 N. Figueroa Street, Room 1350
Los Angeles, California, 90012
Jason.McCrea@lacity.org

Re: Comments on Notice of Preparation for Retreat at Benedict Canyon Project (ENV-2018-1509-EIR)

Dear Jason,

On behalf of the Center for Biological Diversity, we are writing to express our strong opposition to the proposed Retreat at Benedict Canyon Project (“Project”). The Project would result in loss of native biodiversity and increased wildfire risk while providing no benefits to City residents. The Project also contradicts Mayor Eric Garcetti’s commitment to the Green New Deal which pushes for a more sustainable city that protects the environment, reduces greenhouse gas emissions, and provides equal access for all communities to open space.

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 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.) In particular, CEQA requires a lead agency to mitigate to the extent feasible significant impacts, including a significant cumulative climate change impact. (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 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 (Pacifi 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 destroy habitat and riparian areas, the Center urges the City not to move forward with the Project as proposed. To the extent the City nonetheless decides to further consider the Project, the Center urges the adoption of mitigation measures that address the needs of the target species. It is important to consider that different species have different behaviors and needs that affect how they move. For example, smaller species with poor dispersal abilities, like rodents and herpetofauna, would require more frequent intervals of crossings 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. 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 may harm struggling local mountain lions and other native animals and plants*

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. 2016; 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 gene flow with other mountain lion populations is not improved (Benson et al. 2016; 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).

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.

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.¹ 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 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 km² 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

¹ 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>.

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.

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 would further harm the already-imperiled Santa Monica mountain lion population by imposing additional barriers on connectivity, destroying habitat, and increasing noise, traffic, and human disturbance. We urge the City to reject this harmful and unnecessary development proposal.

III. The Project would increase wildfire risk and endanger existing 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 housing 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, and electrical equipment is suspected to have ignited the Silverado and Zogg fires. 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).

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 and grassland communities in its Mediterranean ecosystems are adapted to wildfire to varying degrees, 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) and have less carbon storage capacity than native vegetation communities (Koteen et al. 2011). 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 ultimately perpetuates a feedback loop of increased carbon release and wildfire that fuels climate change while eliminating and degrading California's Mediterranean shrubland and grassland communities and their carbon storage potential. Southern California is especially vulnerable with development pressures to extend the wildland urban interface into adjacent high fire-prone shrublands and grasslands. The Project would likely increase the risk of wildfire and contribute to this feedback loop, thereby further degrading local ecosystems.

IV. The EIR must thoroughly analyze and mitigate the Project's anticipated greenhouse gas emissions

A strong, international scientific consensus has established that human-caused climate change is causing widespread harms to human society and natural systems, and climate change threats are becoming increasingly dangerous. In a 2018 *Special Report on Global Warming of 1.5°C* from the Intergovernmental Panel on Climate Change (IPCC), the leading international scientific body for the assessment of climate change describes the devastating harms that would occur at 2°C warming, highlighting the necessity of limiting warming to 1.5°C to avoid catastrophic impacts to people and life on Earth. The report provides overwhelming evidence that climate hazards are more urgent and more severe than previously thought, and that

aggressive reductions in emissions within the next decade are essential to avoid the most devastating climate change harms.

The impacts of climate change will be felt by humans and wildlife. In California, climate change will transform our climate, resulting in such impacts as increased temperatures and wildfires, and a reduction in snowpack and precipitation levels and water availability. In light of inadequate action on the national level, California has taken steps through legislation and regulation to fight climate change and reduce statewide GHG emissions. (Health & Saf. Code § 38550; *see also* Executive Order B-30-15 (2015); Executive Order S-3-05 (2005); Executive Order B-55-18 (2018).) The Legislature also passed S.B. 100 which requires renewables to account for 60 percent of electricity sales in 2030. Enforcement and compliance with these state-level actions are essential to help stabilize the climate and avoid catastrophic impacts to our environment. However, regional and municipal agencies also have a vital role in reducing our GHG emissions and fighting the climate crisis. Fundamental changes and hard choices in land use planning for the future by local land use agencies will be necessary to fully address and meet the state GHG emissions reduction goals.

Therefore, if the City concludes the Project will have significant GHG impacts, the Center urges the adoption of mitigation measures to reduce GHG emissions to net zero, with a priority given to direct emission reduction measures and on-site mitigation measures. The EIR must also account for greenhouse gas impacts of increased tourism and/or travel to the Project, and mitigate those impacts to the greatest extent feasible. If offsets are used as GHG mitigation, they should only be used when all direct emission reduction measures and on-site mitigation options are exhausted. Any offsets should be tied to local projects and allow for local direct investments that help the surrounding community through the creation of local jobs, reduction in nearby air pollution, and improve impacted infrastructure.

The EIR must also account for the climate impacts of removing native vegetation. The removal and degradation chaparral- and sage scrub-dominated landscapes would result in high amounts of carbon release. Above-ground biomass of these shrub communities were found to be as high as 3461 g/m², with the amount of carbon stored increasing with the age of the stand (Bohlman et al. 2018). In addition, a substantial amount of carbon may be stored belowground in their roots and in the microbial communities and symbiotic fungi that are associated with the roots (Bohlman et al. 2018; Kravchenko et al. 2019; Soudzilovskaia et al. 2019). The removal and degradation of these systems have been found to result in the loss of both above- and below-ground carbon storage (*e.g.*, Austreng 2012). And although these systems are often overlooked in the fight against climate change, they are adapted to hot and dry weather conditions and have been found to be resilient to drought (Luo et al. 2007; Vicente-Serrano et al. 2013), which makes them an untapped opportunity to sequester more carbon as the climate crisis becomes exceedingly urgent. Therefore, the City should be prioritizing the preservation of carbon in existing ecosystems instead of releasing more greenhouse gases and destroying habitats with carbon storage potential for a Project that would destroy native ecosystems and exacerbate traffic congestion and air pollution.

In a November 2018 report, the California Air Resources Board concluded that California is currently not on track to meet its greenhouse gas reduction targets, primarily due to GHG

emissions from the transportation sector. Projects such as the one proposed in the NOP have the potential to widen the gap between where California needs to be to tackle the climate crisis and where it is headed. Therefore, the Center urges the City to take a hard and thorough look at the Project's anticipated GHG emissions, as well as associated air quality, traffic, and transportation impacts, when preparing the EIR.

V. 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 instead allowing for further destruction of these irreplaceable resources for a mansions and a luxury hotel. Because the Project will further degrade connectivity for already-imperiled mountain lions and increase wildfire risk while providing no benefits to City residents, we ask the City Council to reject this unnecessary and harmful proposal.

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 100
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

David Ryu, david.ryu@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.
- 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.
- 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 Multi-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.
- Koteen, L. E., Baldocchi, D. D., & Harte, J. (2011). Invasion of non-native grasses causes a drop in soil carbon storage in California grasslands. *Environmental Research Letters*, 6.
- 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, Corvallis, 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 impacts 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.
- Trall, 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.