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SMMC Item 12 10-28-2019

# **MEMO**

To: Diana Zogran

From: Daniel S. Cooper

**Date**: July 13, 2019

Re: Ecological assessment, Laurelcrest

I report on a site visit to a property at 11472 Laurelcrest Dr., Los Angeles (Studio City), CA 91604, for purposes of checking for nesting birds that might be impacted by proposed construction at the site. The site is an undeveloped hillside lot located on the north slope of the eastern Santa Monica Mountains. A single-family home is proposed for the site, and is anticipated to result in the removal of several mature native trees on the site. I was present at the site between 2:05 – 3:00 PM on July 11, 2019. Conditions were ideal for surveying (82F, clear, no wind).

## **Habitat Description**

The property, as well as the adjacent property to the west, and portions of surrounding properties, are heavily vegetated with native trees, including coast live oak (*Quercus agrifolia*), toyon (*Heteromeles arbutifolia*) and southern California black walnut (*Juglans californica*), and (**Figure 1**). Most of these individual trees appear to be in good health (intact bark, lush green foliage), despite years of drought. Several stumps were observed on the property, indicating that trees have been removed on the site. And, several non-native trees are growing on the site, including Shamel ash (*Fraxinus udhei*) and privet (*Ligustrum* sp.), though are not large or numerous enough to detract from the overall native woodland present.

The understory is largely non-native herbaceous, and appears to be regularly mowed/"weed-whipped." However, I noted two key native understory plant species that – if allowed to persist – would likely be dominant in the understory, poison-oak (*Toxicodendron diversiloba*), and giant wild-rye (*Leymus condensatus*) (**Figure 2**). These species are very common in the understory of native oak woodland in the area (including at Griffith Park and Franklin Canyon Park), and are obviously still present.

## Nesting Bird "Refuge"

I detected several native birds that are likely nesting either on-site, or very close by, based on the presence of begging young or calling pairs. While also present in low numbers in more wooded, less-urbanized residential areas of the Santa Monica Mountains, these are highly characteristic of the local oak woodland ecosystem, including oak titmouse, Pacific-slope flycatcher, and orange-crowned warbler. It is unlikely they would be persisting here without the fairly extensive size of the patch of oak woodland on and adjacent to the property. While these tree species are present scattered around the neighborhood, they do not form a woodland as they do on the property surveyed.

#### Wildlife Corridor

The eastern Santa Monica Mountains are generally considered to lie between Sepulveda Pass in the west and Cahuenga Pass in the east. They represent the most highly-constricted portion of the Santa Monica range, which extends from Pt. Mugu in the west to Griffith Park and the Los Angeles River in the east. In response to a decade of development of small patches of open space that has constricted this corridor even further, on April 23, 2014, Los Angeles City Councilman Paul Koretz proposed a motion (#14-0518), to:

- Issue any building or grading permits only once a project applicant ensures that they will "permanently accommodate wildlife habitat connectivity as part of their development projects";
- Require easements and deed restrictions in perpetuity to project wildlife habitat connectivity;
- Formally designate the area as a "Regional Wildlife Habitat Linkage Zone" in the Municipal Code; and
- Require that each new building project undergo a "habitat connectivity and wildlife permeability review within areas of concern."

This motion unanimously passed on April 22, 2016. Building conditions in the eastern Santa Monica Mountains/"Hollywood Hills" are now subject to a review of wildlife connectivity.

The subject property is located within a patch of undeveloped land south of Laurelcrest Dr., that covers at least an acre. Larger open spaces of Wilacre Park, Fryman Canyon Park, and Briar Summit lie to the west, south, and east, resp. A neighbor of the property (pers. comm. to D. Cooper on 11 July 2019) related seeing mule deer (*Odecoileus hemionus*) walk onto the subject property on the regular basis, and observing them moving south across Laurelcrest Dr. up onto the subject property to browse, and that they then continue to other habitat patches (**Figure 3a**). At just over 1 acre, the open space patch occupied by the subject property is large enough to support foraging mule deer, which presumably utilize it and nearby open space patches on steep slopes as they wander through the hills, which feature several similar-sized patches, including larger protected areas (**Figure 3b**).

Thus, even though I did not observe deer during my visit, I would assert that the property would therefore be considered part of a "linkage zone" (through the eastern Santa Monica Mountains), and would itself contain a wildlife corridor. Given how few open habitat patches are left in the Laurelcrest area, it is logical to assume that eventually, one house will

be one too many for this species, and that mule deer will cease using the area, reducing the population in the eastern Santa Monica Mountains.

I recommend conducting a full "habitat connectivity and wildlife permeability review", as well as a plan to preserve nesting habitat for native oak bird species onsite as part of the conditions of development.

I hereby certify that the information herein is correct.

Daniel S. Cooper

Daniel Cooper

President, Cooper Ecological Monitoring, Inc.

## Figures



Figure 1. Typical view of subject property (view south), showing dense cover of native oak woodland.



Figure 2. View of understory of subject property, showing emergence of native poison-oak, an indicator of intact oak woodland understory.



Figure 3a. Presumed wildlife corridor linking patches of habitat across Laurelcrest Dr. (subject property within area shaded in red).

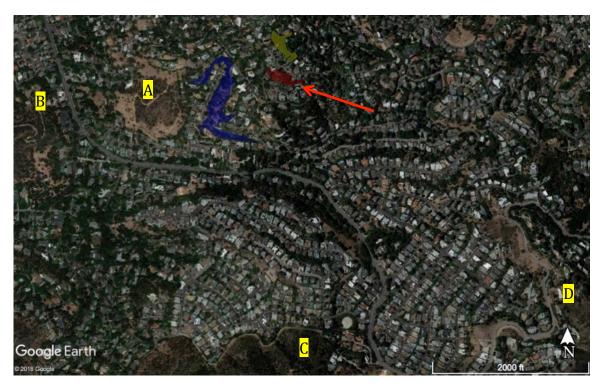


Figure 3b. Regional view of subject property (red arrow) in relation to other patches of open space in area, including Hirsch property (A), Wilacre Park (B), Fryman Canyon (C), and Briar Summit (D).

## **Birdlist**

Laurelcrest Dr., Los Angeles, California, US Jul 11, 2019 2:05 PM - 3:00 PM Comments: 82F, clear/calm

Mourning Dove (Zenaida macroura) 4
Pacific-slope Flycatcher (Empidonax difficilis) 2
Black Phoebe (Sayornis nigricans) 2
Oak Titmouse (Baeolophus inornatus) 2
Bushtit (Psaltriparus minimus) 5
Bewick's Wren (Thryomanes bewickii) 1
House Finch (Haemorhous mexicanus) 2
Dark-eyed Junco (Oregon) (Junco hyemalis [oreganus Group]) 1
California Towhee (Melozone crissalis) 1
Spotted Towhee (Pipilo maculatus) 1
Hooded Oriole (Icterus cucullatus) 2
Orange-crowned Warbler (Oreothlypis celata) 1

#### **Contact Information**

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#### Overview

Daniel S. Cooper is the author of Important Bird Areas of California (Audubon California 2004), and is an authority on California bird ecology, identification and distribution. He has a strong background in natural history and biodiversity, and has designed and managed numerous monitoring and assessment projects for a variety of clients, both in the U.S. and abroad. He worked as an independent consultant and researcher for several years before returning to UCLA to pursue a PhD in 2017.

#### Areas of Expertise

- · Biological assessments for public and private lands;
- · Bird and wildlife surveys, including protocol-level surveys;
- Environmental compliance (CEQA/NEPA) and monitoring

#### Years of Experience

CEM, Inc.: 12 years Audubon California: 5 years

#### Education

BA/1995/Harvard University MSc (Biogeography)/1999/UC Riverside PhD (currently enrolled)/UCLA

#### Certifications

U.S. Fish and Wildlife Permit No. TE-100008-2 (Yellow-billed Cuckoo, Southwestern Willow Flycatcher, California Gnatcatcher).

CDFG Scientific Collecting Permit SC-10615 (as above; add: San Diego Cactus Wren)

USGS Master Station Banding Permit #23049 (2001-2004)

## Recent Boards

Associate Editor, Western Birds, 2014 -Southern California Academy of Sciences, 2012 - 2015 Los Angeles Co. Dept. of Regional Planning - Sensitive Environmental Areas Tech. Adv. Com., 2009 - 2014. Southern California Beach Metrics Working Group, 2009 -

## Teaching/Advising

California State University, Los Angeles, CA. Advisor, graduate student committee member.

Loyola Marymount Univ. (CUReS), Westchester, CA. Cotaught BIO 398 (field biology); advisor, graduate student committee member.

UCLA Extension School, Los Angeles, CA. Instructor (conservation biology and bird monitoring)

University of California, Riverside, CA. Graduate Teaching Assistant, geomorphology, natural disasters, & astronomy.

## Daniel S. Cooper

President, Cooper Ecological Monitoring, Inc.

#### Long-term Projects

#### Griffith Park Natural History Survey

Researched and co-authored Griffith Park Wildlife Management Plan. Supervised development of website (www.griffithparkwildlife.org; with Cartifact, Inc.). Developed first-ever study of wildlife of Griffith Park, focusing on the 2007 burn area, including plants, breeding/wintering birds, reptiles/amphibians, and bats (ongoing).

Local Coastal Plan updates, Los Angeles Co. Worked with County Department of Regional Planning to develop conservation & management plan for Marina del Rey's LCP update, and to inventory and map biodiversity hotspots in central Santa Monica Mountains for the L.A. Co. Coastal Zone LCP update (2009-2014).

#### Baseline Bird Survey, Ballona Wetlands, Los Angeles.

Designed, organized and carried-out first major all-bird survey of entire Ballona Wetlands Ecological Reserve and adjacent lands for Santa Monica Bay; coordinated protocollevel and volunteer-led surveys for sensitive species, waterbirds, raptors, and breeding songbirds of the 500-acre site (2009-2012).

Harvard Forest, Petersham, MA. Visiting researcher in 2011, 2013, and 2016, studying the changes in avifauna and lepidoptera since 1993 surveys (as an undergraduate student) (ongoing).

#### **Selected Publications**

Cooper, D.S. and A.E. Muchlinski. 2015. Recent decline of lowland populations of the western gray squirrel in the Los Angeles area of southern California. Bull. Southern California Acad. Sci. 114(1):42-53.

Bonebrake, T.C. and D.S. Cooper. 2014. A Hollywood drama of butterfly extirpation and persistence over a century of urbanization. Journal of Insect Conservation 18(4):683-692.

Cooper, D.S., L.S. Hall and A.J. Searcy. 2014. A population census of the cactus wren in Ventura County, California. Western Birds 45(1):43-56

Cooper, D.S. 2012. Rare plants of Griffith Park, Los Angeles, California. Fremontia 38(4)/39(1):18-24.



SMMC Item 12 10-28-2019

July 14, 2019

Kevin James, President Board of Public Works City of Los Angeles 200 North Spring Street, Room 361 Los Angeles, CA 90012

Re: BPW-2019-0508, Tree Removal - 11472 Laurelcrest Drive

Dear President James and Commissioners:

City staff has proposed that the Board of Public Works determine that a planned single-family residence at 11472 Laurelcrest Drive should be found to be categorically exempt from analysis under the California Environmental Quality Act. We have reviewed the proposed Categorical Exemption, along with information about the project site, and conclude that the project would have significant impacts on the environment as proposed and that those impacts would not be mitigated through application of the protected tree ordinance or the other existing regulations of the City of Los Angeles.

## 1 Staff Failed To Recognize Coast Live Oak-California Walnut Woodland

The vegetation association on the property should be identified as Coast Live Oak–California Walnut woodland (Keeler-Wolf and Evens 2006), which has a California Natural Community Code of 71.060.27 (see https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153398). First, the oak species on site is not Interior Live Oak (*Quercus wislizeni*), but Coast Live Oak (*Quercus agrifolia*) (see details below). Second, it is not simply a Coast Live Oak woodland because the presence of California Walnut on the site, along with the presence of characteristic understory species such as Giant Wild Rye and Poison Oak, are diagnostic for identification of Coast Live Oak–California Walnut woodland. The guide to identifying this vegetation association describes it as follows:

California walnut is subdominant to codominant with coast live oak in the overstory, and the understory may be open and grassy or may have shrub layer with poison oak.

. . .

Note: Two phases of this association occur: One in which the shrub layer is low in cover (trace cover of poison oak) while the herbaceous layer is usually moderately to highly developed, and another in which the shrub layer has moderate to high cover of poison oak and other shrub species such as toyon and elderberry (Keeler-Wolf and Evens 2006).

The *Quercus agrifolia–Juglans californica* association has a global conservation status rank of G3 ("Vulnerable—At moderate risk of extinction due to a restricted range, relatively few populations [often 80 or fewer], recent and widespread declines, or other factors"), and is recognized as a sensitive natural community by the California Department of Fish and Wildlife. Whether or not the proposed building itself would impact walnut trees is irrelevant; the oaks that would be removed are part of the oak—walnut woodland.

Mitigation measures that are tied to replacing individual protected trees, such as Coast Live Oak, are ineffective at mitigating impacts to whole vegetation alliances. Native tree protection ordinances focus on the specimens, but CEQA analysis requires recognition of the whole community of organisms that live within an area, in this instance within the oak—walnut woodland. Replacement of specimen trees on a site that has the habitat area significantly reduced to accommodate a large single-family home and pool does not offset the impacts to the recognized sensitive natural community.

The Coast Live Oak—California Walnut association is a subtype of Coast Live Oak woodland. The strong relationships between oaks generally and wildlife are well established. An oft-cited figure reports that 320 species of vertebrates and 5,000 species of insects are associated with oak woodlands (Block et al. 1990, Pavlik et al. 1991). These totals make oak woodlands the richest overall wildlife habitats in California, and rank among the top three habitats for birds (Wilson et al. 1991). Oak woodlands are threatened by fire suppression, overgrazing, urban development, and disease. It is for this reason that the destruction of oak woodlands in general constitutes a significant environmental impact, and the association at the project site is even more important as a sensitive vegetation community. Again, these impacts are to the total area covered by the woodland, not just the impacts to the individual trees.

Replacing individual trees but not habitat area is ineffective. Scientists have firmly established the predictable relationship between habitat area and the number of species supported by that area (Arrhenius 1921, Preston 1948). The relationship, referred to as the "species—area curve," is expressed by the equation  $S = cA^z$  where S is number of species, A is area, and c and c are constants that vary by the ecosystem type and the geographic configuration of the area. If A decreases, then S also decreases. Because the proposed project would reduce the habitat area on the site considerably (at least by 30%), it will have a resulting impact on the number of species supported by the site. For example, of the rich complement of oak woodland bird species, some will be eliminated from the site as a result of the project and the replacement plantings of trees will be insufficient mitigation because they do not replace the area lost. People often imagine that wildlife at a development site will simply move to a new area after development but this is not true; any suitable habitat surrounding will already be occupied and the wildlife numbers are reduced each time habitat is lost through development.

It is obvious that the proposed project would have a significant adverse impact on the environment through the loss of sensitive native vegetation and that the mechanism of individual oak tree replacement would be insufficient to address such loss.

## 2 Oak Species Is Misidentified

The City's proposed Categorical Exemption reports that Interior Live Oak (*Quercus wislizeni*) grows at the site. This is a misidentification by the landscape architect who prepared the protected tree report. Interior Live Oak is adapted to higher elevations than the project site and is only found as shrubby individuals in the Santa Monica Mountains (Keeler-Wolf and Evens 2006). Two records of this species are found in Griffith Park (reported by the Consortium of California Herbaria) but otherwise it is absent from the eastern Santa Monica Mountains. Were it actually present, it would be a significant and rare occurrence for which removal would constitute a significant adverse impact to biological resources. The Urban Forestry Division apparently lacks the expertise to recognize when a species is outside of its range, highlighting the lack of appropriate environmental review that has been undertaken for this project.

## 3 Lighting from New Structure Would Impact Wildlife

The impacts of lighting on all types of wildlife and plants are now increasingly well known (Longcore and Rich 2004, Rich and Longcore 2006, Gaston 2013, Gaston et al. 2013, Bennie et al. 2016, Longcore and Rich 2017). Artificial light at night can have a range of lethal and sublethal effects on wildlife (Longcore and Rich 2004, Rich and Longcore 2006, Gaston et al. 2012, Gaston et al. 2013, Meyer and Sullivan 2013). Moths are especially attracted to lights and they play a special role in the ecosystem as pollinators. Moths are killed in collisions with the lights or by becoming trapped in housings (Frank 1988, 2006). Short of death, this attraction removes native insects from their natural environments (Meyer and Sullivan 2013) in what Eisenbeis (2006) calls the "vacuum cleaner effect." Some wildlife species will avoid areas with additional lighting (Beier 1995, 2006, Stone et al. 2009, Stone et al. 2012) or otherwise be adversely impacted (Hölker et al. 2010a, Hölker et al. 2010b, Longcore 2010, Gaston et al. 2013).

Without review and mitigation under CEQA, no mechanism exists to protect wildlife from the impacts of lighting. The City's ordinance to address nighttime lighting is only designed to protect people from nuisance glare (LAMC Section 93.0117), which, incidentally, it does poorly. The code, as follows, does not address impacts on wildlife:

No person shall construct, establish, create, or maintain any stationary exterior light source that may cause the following locations to be either illuminated by more than two footcandles (21.5 lx) of lighting intensity or receive direct glare from the light source:

- 1. Any exterior glazed window or sliding glass door on any other property containing a residential unit or units.
- 2. Any elevated habitable porch, deck or balcony on any other property containing a residential unit or units.
- 3. Any ground surface intended for uses such as recreation, barbecue, or lawn areas on any other property containing a residential unit or units.

EXCEPTIONS: This subsection shall not apply to:

1. Any frosted light source emitting 800 lumens or less.

2. Any other light source emitting more than 800 lumens where the light source is not visible to persons on other residential property.

The ordinance excludes from regulation any lighting sources not visible by people and therefore cannot be relied upon to mitigate the many impacts to natural ecosystems and wildlife species from night lighting. It is utterly useless as a means to protect sensitive natural resources. Without appropriate analysis and mitigation measures, it is likely that the proposed new building will produce glare and illumination that will degrade remaining sensitive habitat on the project site following construction.

## 4 Glass Poses a Collision Hazard for Birds

Bird species that are resident or would use the site as stopover or wintering habitat would collide with windows at the proposed structure (Klem 2009, Loss et al. 2014, Cusa et al. 2015). Glass poses the greatest danger to birds when it is located close to trees and other vegetation. Birds do not perceive reflections of vegetation as being obstructions and fly into the glass (Sheppard and Phillips 2015). Having a structure immediately adjacent to native vegetation would pose a greater danger to birds (which may include sensitive species) than construction that is not immediately adjacent to high-quality vegetation (see discussion in Gelb and Delacretaz 2006, Kensek et al. 2016). The City of Los Angeles does not have any regulations in place that would mitigate the adverse impacts of introducing a new source of bird mortality into a sensitive wildlife habitat.

## 5 Construction Noise Would Cause Adverse Impacts

Noise has adverse impacts on wildlife as well that are not addressed in the limits on construction hours in place in the City of Los Angeles. A significant scientific literature can be found to document that noise has a range of adverse impacts on wildlife (see e.g., Slabbekoorn and Ripmeester 2008), including interference with communication of songbirds, distraction of prey species (making them more susceptible to predation), and a whole range of other adverse impacts (Chan et al. 2010, Laiolo 2010). The City has never provided evidence that its noise ordinances would reduce impacts on wildlife to a less than significant level by limiting construction hours and therefore it can be assumed that the proposed project would have a significant impact on wildlife from noise when compared with the baseline conditions at the project site.

Please consider these comments in your review of the proposed Categorical Exemption and find that the project does not qualify for such an exemption.

Sincerely,

Travis Longcore, Ph.D. Certified Senior Ecologist Catherine Rich, J.D., M.A.

## 6 Qualifications

Dr. Travis Longcore and Catherine Rich are principals of Land Protection Partners. Dr. Longcore is Associate Adjunct Professor in the Institute of the Environment and Sustainability at UCLA. He has taught, among other courses, Bioresource Management, Environmental Impact Analysis, Field Ecology, and Ecological Factors in Design. He was graduated summa cum laude from the University of Delaware with an Honors B.A. in Geography, holds an M.A. and a Ph.D. in Geography from UCLA, and is professionally certified as a Senior Ecologist by the Ecological Society of America and as a GIS Professional by the Geographic Information System Certification Institute. He is Chair of the Los Angeles County Environmental Review Board. Catherine Rich is Executive Officer of The Urban Wildlands Group. She holds an A.B. with honors from the University of California, Berkeley, a J.D. from the UCLA School of Law, and an M.A. in Geography from UCLA. She is lead editor of *Ecological Consequences of Artificial* Night Lighting (Island Press, 2006) with Dr. Longcore. Longcore and Rich have authored or coauthored over 45 scientific papers in top peer-reviewed journals such as Auk, Avian Conservation and Ecology, Biological Conservation, Conservation Biology, Environmental Management, Trends in Evolution and Ecology, and Frontiers in Ecology and the Environment. Longcore and Rich have provided scientific review of environmental compliance documents and analysis of complex environmental issues for local, regional, and national clients for 21 years.

## 7 Literature Cited

- Arrhenius, O. 1921. Species and area. Journal of Ecology 9:95–99.
- Beier, P. 1995. Dispersal of juvenile cougars in fragmented habitat. Journal of Wildlife Management **59**:228–237.
- Beier, P. 2006. Effects of artificial night lighting on terrestrial mammals. Pages 19–42 *in* C. Rich and T. Longcore, editors. Ecological Consequences of Artificial Night Lighting. Island Press, Washington, D.C.
- Bennie, J., T. W. Davies, D. Cruse, and K. J. Gaston. 2016. Ecological effects of artificial light at night on wild plants. Journal of Ecology **104**:611–620.
- Block, W. M., M. L. Morrison, and J. Verner. 1990. Wildlife and oak-woodland interdependency. Fremontia **18**:72–76.
- Chan, A. A. Y.-H., P. Giraldo-Perez, S. Smith, and D. T. Blumstein. 2010. Anthropogenic noise affects risk assessment and attention: the distracted prey hypothesis. Biology Letters **6**:458–461.
- Cusa, M., D. A. Jackson, and M. Mesure. 2015. Window collisions by migratory bird species: urban geographical patterns and habitat associations. Urban Ecosystems **18**:1427–1446.
- Eisesbeis, G. 2006. Artificial night lighting and insects: attraction of insects to streetlamps in a rural setting in Germany. Pages 281–304 *in* C. Rich and T. Longcore, editors. Ecological consequences of artificial night lighting. Island Press, Washington, DC.
- Frank, K. D. 1988. Impact of outdoor lighting on moths: an assessment. Journal of the Lepidopterists' Society **42**:63–93.
- Frank, K. D. 2006. Effects of artificial night lighting on moths. Pages 305–344 *in* C. Rich and T. Longcore, editors. Ecological Consequences of Artificial Night Lighting. Island Press, Washington, D.C.
- Gaston, K. J. 2013. A green light for efficiency. Nature 497:560–561.

- Gaston, K. J., J. Bennie, T. W. Davies, and J. Hopkins. 2013. The ecological impacts of nighttime light pollution: a mechanistic appraisal. Biological Reviews 88:912–927.
- Gaston, K. J., T. W. Davies, J. Bennie, and J. Hopkins. 2012. Reducing the ecological consequences of night-time light pollution: options and developments. Journal of Applied Ecology **49**:1256–1266.
- Gelb, Y., and N. Delacretaz. 2006. Avian window strike mortality at an urban office building. The Kingbird **56**:190–198.
- Hölker, F., T. Moss, B. Griefahn, W. Kloas, C. C. Voight, D. Henckel, A. Hänel, P. M. Kappeler,
  S. Völker, A. Schwope, S. Franke, D. Uhrlandt, J. Fischer, R. Klenke, C. Wolter, and K.
  Tockner. 2010a. The dark side of light: a transdisciplinary research agenda for light
  pollution policy. Ecology and Society 15:article 13.
- Hölker, F., C. Wolter, E. K. Perkin, and K. Tockner. 2010b. Light pollution as a biodiversity threat. Trends in Ecology and Evolution **25**:681–682.
- Keeler-Wolf, T., and J. Evens. 2006. Vegetation classification of the Santa Monica Mountains National Recreation Area and environs in Ventura and Los Angeles counties, California. Report to National Park Service. California Department of Fish and Game and California Native Plant Society, Sacramento, California.
- Kensek, K., Y. Ding, and T. Longcore. 2016. Green building and biodiversity: facilitating bird friendly design with building information models. Journal of Green Building 11:116–130.
- Klem, D., Jr. 2009. Preventing bird-window collisions. Wilson Journal of Ornithology **121**:314–321.
- Laiolo, P. 2010. The emerging significance of bioacoustics in animal species conservation. Biological Conservation **143**:1635–1645.
- Longcore, T. 2010. Sensory ecology: night lights alter reproductive behavior of blue tits. Current Biology **20**:R893–R895.
- Longcore, T., and C. Rich. 2004. Ecological light pollution. Frontiers in Ecology and the Environment 2:191–198.
- Longcore, T., and C. Rich. 2017. Artificial Night Lighting and Protected Lands: Ecological Effects and Management Approaches (Revised August 2017). Natural Resource Report NPS/NRSS/NSNS/NRR—2017/1493. National Park Service, Fort Collins, Colorado.
- Loss, S. R., T. Will, S. S. Loss, and P. P. Marra. 2014. Bird-building collisions in the United States: estimates of annual mortality and species vulnerability. Condor **116**:8–23.
- Meyer, L. A., and S. M. P. Sullivan. 2013. Bright lights, big city: influences of ecological light pollution on reciprocal stream-riparian invertebrate fluxes. Ecological Applications **23**:1322–1330.
- Pavlik, B. M., P. C. Muick, S. Johnson, and M. Popper. 1991. Oaks of California. Cachuma Press and California Oak Foundation, Los Olivos.
- Preston, F. W. 1948. The commonness, and rarity, of species. Ecology 29:254–283.
- Rich, C., and T. Longcore, editors. 2006. Ecological Consequences of Artificial Night Lighting. Island Press, Washington, D.C.
- Sheppard, C., and G. Phillips. 2015. Bird-Friendly Building Design, 2nd Ed., American Bird Conservancy, The Plains, Virginia.
- Slabbekoorn, H., and E. A. P. Ripmeester. 2008. Birdsong and anthropogenic noise: implications and applications for conservation. Molecular Ecology 17:72–83.
- Stone, E. L., G. Jones, and S. Harris. 2009. Street lighting disturbs commuting bats. Current Biology **19**:1123–1127.

- Stone, E. L., G. Jones, and S. Harris. 2012. Conserving energy at a cost to biodiversity? Impacts of LED lighting on bats. Global Change Biology **18**:2458–2465.
- Wilson, R. A., P. Manley, and B. R. Noon. 1991. Covariance patterns among birds and vegetation in a California oak woodland. Pages 126–135 *in* R. B. Standiford, editor. Proceedings of the symposium on oak woodlands and hardwood rangeland management. Gen. Tech. Rep. PSW-GTR-126. Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, Berkeley, California.