

January 7, 2014

Nora Monette
Principal Project Manager
David J. Powers & Associates
1885 The Alameda # 204
San Jose, CA 95126

Re: Orchard Parkway Proposed Electronic Sign and Potential Impacts to Wildlife

Dear Ms. Monette:

This letter addresses the potential for a proposed electronic, billboard-type sign along the Highway 101 freeway in San Jose, California (Project) to result in adverse effects to wildlife, and/or “take” injury or mortality), with a specific focus on the artificial nocturnal light that would be generated by the sign. Adverse effects to wildlife due to artificial nocturnal lighting, migratory birds in particular, has received substantial attention in recent years and is increasingly being incorporated into regulations and guidance documents.

Freeway sign background

The Project would consist of the installation of a double-sided, free-standing programmable electronic freeway sign at the planned Orchard Parkway commercial development site in the northern portion of the City of San Jose, Santa Clara County, California. The project site is located at the terminus of Atmel Way and adjacent to the Highway 101 freeway and associated on-/off-ramps. The proposed sign would be approximately 1,900 feet east of Runway 30R-12L at the Norman Y. Mineta San José International Airport. Additionally, an urban reach of the Guadalupe River is located in the immediate vicinity of the proposed sign. The center of the river’s channel is approximately 250 feet from the location of the proposed sign, and the eastern edge of riparian and emergent vegetation along the river is approximately 200 feet away from the sign.

The proposed sign structure would be up to 60 feet in height and oriented to freeway lane views from Highway 101, including both north- and southbound views. The maximum overall sign area would not exceed 500 square feet per side and the programmable electronic sign surface would not exceed 375 square feet (12.5 feet by 30 feet).

The illuminated double-sided sign is proposed to operate under specific criteria in the City of San Jose’s Municipal Code (i.e., Section 23.02.905 – “Limitations on programmable electronic signs”), as well as applicable regulations under the California Vehicle Code to limit the potential for distracting vehicle drivers’ viewing of the displays. Criteria of operation include: 1) images on the sign would not change at a rate greater than once every eight seconds; and, 2) signs would use automatic dimming technology to adjust the brightness of the sign relative to ambient light. The maximum ambient light output level of the sign message faces would be 0.3 foot-candles or less as measured at a distance of 200 feet. Within the context of existing and planned artificial lighting in the vicinity, the added illuminance from the sign to the Guadalupe

River during nighttime hours is estimated to be approximately 0.05 foot-candles at the center of the channel bed, and approximately 0.1 foot-candles at the edge of the concrete retaining wall separating the Orchard Parkway development site from the eastern edge of the Guadalupe River parkway.

In conformance with relevant municipal codes, the programmable sign faces could be operated continuously (24 hours per day). Under a second scenario, the sign faces would not be illuminated between the hours of 10:00 PM and 6:00 AM.

Local regulations and policies

Section 23.02.905 of the Municipal Code does not specifically address potential impacts to wildlife. A September 2014 memorandum to the City's Transportation & Environment Committee outlines recommendations for bird-safe building design standards within San Jose; this memorandum does not mention freeway signs or programmable signs specifically, though it does recommend that non-emergency lighting be turned off at night (particularly during bird migration season, February-May and August- November).

Special-status wildlife species

Special-status wildlife species are those with legal protections beyond baseline levels, and include those that have been formally listed (as Endangered or Threatened) or are candidates for listing under the respective federal and California Endangered Species Acts. In addition, California Department of Fish and Wildlife (CDFW) Species of Special Concern (species that face extirpation in California if current trends continue) and U.S. Fish and Wildlife Service Birds of Conservation Concern are also considered special-status species due to the special consideration they are warranted under the California Environmental Quality Act. In addition to regulations for special-status species, most birds in the United States (including non-status species) and their active nests (those with eggs and/or young) are protected by both the federal Migratory Bird Treaty Act of 1918 and the California Fish and Game Code.

The potential for special-status wildlife species to occur within the Orchard Parkway commercial development site is limited due primarily to its urban environment and surrounding development. Furthermore, the currently-undeveloped portions of the site are all scheduled for development, further reducing the potential for occurrence. Special-status wildlife species known to be present at or adjacent to the site including the following:

Burrowing owl (*Athene cunicularia*) – CDFW Species of Special Concern, USFWS Bird of Conservation Concern. The burrowing owl is a small, primarily terrestrial and fossorial (subterranean-dwelling) owl that inhabits grasslands and other open areas, and uses mammal burrows for shelter and nesting. Ground squirrel burrows are the most commonly-used shelter in northern California. Burrowing owls have a varied diet but are primarily insectivorous; foraging may occur at any time, but is most typical at night and during twilight. WRA biologists have observed this species within the general Orchard Parkway development site intermittently during annual surveys conducted from 2007 to the present, mostly recently in 2014, when a pair apparently nested on-site. Although these owls were passively relocated from the property on which they were present (using CDFW-approved methodology)¹ in preparation for development, burrowing owls may be present in the future within nearby undeveloped properties.

¹ Additionally, the development area's burrowing owl habitat mitigation needs have been met as per an earlier agreement with the CDFW.

Steelhead (*Oncorhynchus mykiss irideus*) - Central California Coast DPS. Federal Threatened.

The steelhead is essentially the native rainbow trout (*O. mykiss*) of coastal California watersheds that spends part of its life cycle in freshwater and part in the ocean. This species typically migrates to marine waters after spending two years in freshwater. After two to three years in the ocean, they then return to their natal streams to spawn as 4- or 5-year olds. As per a technical report by Leidy (2005) that summarizes the known distribution of steelhead populations in Santa Clara County, the Guadalupe River supports a steelhead run. Although the urbanized reach of the river adjacent to the Orchard Parkway site is highly modified and does not provide steelhead spawning habitat, this reach is used for in- and out-migration. Thus, small numbers of steelhead (i.e., in- and out-migrating adults, as well as out-migrating juveniles) may be expected to be intermittently present within this reach of the river at certain times of year. Additionally, steelhead migration often occurs at night.

Chinook salmon (*Oncorhynchus tshawytscha*) – legal status dependent upon timing and location of spawning; many runs are federal and/or stated listed. The chinook salmon is the most abundant salmon species in California; adults migrate from the marine environment into their natal freshwater streams and rivers to spawn, and then subsequently die. Various geographic populations exist (as defined by spawning location and timing), and legal statuses vary between them. As summarized by Leidy (2007), the Guadalupe River supports a small chinook population, but the origin and status of this population is uncertain; a genetic analysis of Guadalupe River chinook suggested that these fish are related to Central Valley and Oregon hatchery stock, and thus would not have legal protections. Even if found to be of non-hatchery origin, chinook salmon within the Guadalupe River would be considered “fall-run” or “late fall run” and thus would not warrant protection under the federal or California Endangered Species Acts, though they would likely be considered Species of Special Concern by the CDFW.

Background literature

A variety of available background literature concerning building and/or artificial lighting and bird strikes was reviewed in preparation of this letter. The primary source of information used here is *Ecological Consequences of Artificial Night Lighting* (book) by Rich and Longcore (2006).

For birds, the following literature was also reviewed:

- “Bird-Friendly Building with Glass and Light” (Schmid et al. 2013)
- “Evaluation of New Obstruction Lighting Techniques to Reduce Avian Fatalities” (Patterson 2012)
- “Bird-Friendly Building Design” (Sheppard 2011)
- “Standards for Bird-Safe Buildings” (San Francisco Planning Department 2011)
- Newark Clear Channel Billboards Project Biological Impacts Assessment (H.T. Harvey & Associates 2011)

Results of literature review

With the exception of H.T. Harvey & Associates (2011) and a handful of similar (though less detailed) biological resources review documents, the literature review found no direct references to electronic signs. Because they are a new technology, presumably very few if any studies on the effects of such signs to birds and other wildlife have been conducted. A summary of the literature regarding artificial lighting and its known effects on wildlife is presented below for

different taxonomic groups; for most groups, the primary reference is Rich and Longcore (2006).

Birds

The phenomenon of birds being attracted to and disoriented by artificial lighting, often resulting in mortality, is well-documented, most particularly for powerful light sources such as lighthouses, lightships and floodlit buildings and structures. This phenomenon is especially pronounced for nocturnally-migrating birds during foggy conditions and/or when the cloud ceiling is low. Although elements of the literature conflict with each other regarding the susceptibility of birds to different types of lighting, Rich and Long core suggest that wavelength and light intensity are the most important variables, and that shorter wavelength (ultra-violet) and less intense lights are far less likely to attract birds.

References to birds and billboards in the literature involved traditional, non-electronic billboards which are illuminated at night by individual lights fixed around the sign itself. In such cases, the common recommendation in the literature was to face sign illuminations downward, i.e. place illuminating lights at the top of the sign to avoid directing light upward where it is more easily perceived by nocturnal aerial wildlife.

Patterson (2012) summarized studies conducted on bird attraction to obstruction lights, which are those used on radio towers and similar structures at night to visually warn airplane pilots of the presence of these structures. The conclusion was that flashing lights (i.e., lights repeatedly activated and de-activated on short time scales, versus being continuously illuminated) were less likely to attract or disorient birds than continuously activated lights. Patterson (2012) also stated that LED light sources (the type that would be employed on the Project's sign) are generally regarded by wildlife biologists as less likely to attract birds than more traditional lighting mechanisms.

H.T. Harvey & Associates (2011) assessed the potential for a proposed electronic sign in Newark, California to adversely affect biological resources, including birds. The report's author concluded that 1) the physical signs themselves would not affect birds, and 2) while there was some potential for the sign's lighting to attract and/or disorient birds (particularly during foggy or rainy periods when migrating birds tend to fly lower to the ground), bird strikes were unlikely and disorientation was likely to be momentary. The reasons given for this conclusion were 1) the sign would be oriented toward a transportation corridor, 2) colors and lighting intensity on the sign would regularly change on short time scales (with different advertisements), and 3) shades would be placed along each row of lights to direct light from reaching upward from the sign.

Bats

As summarized by Rich and Longcore (2006), because they tend to congregate insects in space and time, street lights and similar sources of fixed, bright nocturnal lighting are attended by many species of foraging bats. This tendency is associated with foraging guild: fast-flying species that forage in open areas typically show the strongest predilection for foraging near lights. Such artificial light sources likely increase foraging efficiency for these species, at least in some contexts, and thus may have positive effects on the local populations of these bats. Other bat species appear to avoid foraging in the vicinity of artificial nocturnal light, and thus well-lit areas may have a deterrence effect on these bats, resulting in potential negative effects to local populations if lighting is widespread within otherwise suitable foraging areas.

Other mammals

As per Rich and Longcore (2006), little is known about the effects of artificial lighting on mammals other than bats. However, given what is known about mammal biology and behavior (e.g., the majority of species are nocturnal), Rich and Longcore (2006) state that artificial lighting should be presumed to have at least some negative baseline effects.

Fishes

As per Rich and Longcore (2006), fishes as well as their aquatic invertebrate prey have been documented to modify their behavior in response to artificial nocturnal lighting, including altering their activity patterns (both spatially and temporally) and avoiding lit areas. As might be expected, the effects tend to be strongest in aquatic features with shallow and/or clearer water, e.g. streams and creeks. Most examples provided involved strong light sources placed directly over or adjacent to the aquatic habitats in question, e.g. street lamps illuminating a discrete area. Such effects have shown in “Pacific salmon” species, including both steelhead and chinook salmon; adult and juvenile salmonids migrating in freshwaters may avoid and/or be attracted to areas subjected to artificial night lighting, with the responses varying between salmonid species and/or environmental contexts of the lit area(s).

Assessment of Project

Birds

As stated previously, the effects of electronic signs on birds do not appear to have been studied. Nevertheless, recent guidance documents whose primary intent is to encourage bird-friendly infrastructure and architecture do not address electronic signs, suggesting that they are not currently viewed as a noteworthy contributor to incidental bird take. The literature review did find recent position documents from environmental and wildlife conservation groups expressing a general opposition to electronic signs (e.g., a formal Position Statement from the Golden Gate chapter of the Audubon Society dated February 2013), but such positions appeared to be based solely on principle and/or broad summaries of what is known about artificial light, with no specific data related to electronic signs.

The proposed sign for the Orchard Parkway site seems unlikely to result in a level of bird take that would be considered “significant” under standard environmental analyses. The rationale for this conclusion is as follows:

- The sign would be located on and visually oriented toward drivers along a highly urbanized transportation corridor (Highway 101) that is already subject to substantial and widespread artificial light, as well as a wide variety of other visual (and acoustic) disturbances. The Highway 101 corridor is thus unlikely to be used by low-flying migrating birds.
- The sign would be located amid a developed area with other sources of artificial light in close proximity, presumably including artificial night lighting on and/or within buildings; it seems unlikely that the sign would increase the overall magnitude of artificial light in the vicinity.

- The location of the proposed sign is over 4.0 miles from the fringes of south San Francisco Bay and associated Bay fringe habitats (e.g., former salt ponds) that are used by large numbers of migrating birds that may travel in large groups relatively close to the ground (e.g., shorebirds and waterfowl).
- While presumably a local movement corridor as well as general habitat for birds and other wildlife (see below), the portion of the Guadalupe River near the proposed sign is unlikely to be used as a true migration flyway or corridor for nocturnally-moving birds. Birds using the river and affiliated emergent marsh and riparian vegetation will most typically be year-round residents in the area or local summer residents (i.e., migratory birds breeding there).
- If still present in the area at the time of sign installation and operation, burrowing owls may actually benefit from the sign, due to increased insect abundance near the sign at night and increased foraging efficiency. WRA biologists (personal observation) observed burrowing owls foraging in association with artificial nocturnal lighting at a semi-urban project site in Solano County in 2014, although the extent to which such behavior is common for this species is unknown.

Bats

Given the highly urban setting of the Orchard Parkway development site, the immediate vicinity of the Project is unlikely to support roosting (maternity or otherwise) by special-status bats. However, some non-special-status bats may roost in the area, and these and other bat species likely forage in the area, including along the Guadalupe River corridor. Presumably the vast majority of these bats are common species, though some special-status or otherwise rare species may also occasionally forage there.

Although the magnitude of insect attraction to the proposed sign at night is difficult to even approximate, insects will presumably be attracted to the sign at night. As such, at least some bats foraging in the area will presumably alter their behavior to forage near the sign (species prone to foraging near artificial nocturnal lighting), and others may alter their behavior to avoid the sign (species averse to foraging near artificial nocturnal lighting). The proposed sign thus may increase the foraging efficiency for some bat species (a beneficial effect), and discourage other species from using the immediate area (an adverse effect). However, given the abundance of artificial nocturnal lighting sources in urban San Jose in general, such effects should be considered discountable overall, particularly the potential adverse effects since the total area of foraging space that would be affected is relatively small.

Any bats roosting underneath the Highway 101 bridge (over the Guadalupe River) adjacent to the Project site are unlikely to be disturbed by the sign, as the extent of light penetration beneath the bridge is anticipated to be discountable.

Fishes

While artificial night lighting has been shown to alter the behavior of some fishes, including salmonids, any effects on special-status salmonids due to the Project are anticipated to be discountable. No spawning habitat for these species is present within the river near the proposed sign, and the amount of increased illuminance to be generated by the sign is unlikely to modify migration behavior given both the short periods of time that migrating salmonids are expected to be present in the area and the anticipated magnitude of illumination.

Guadalupe River

The Project is unlikely to adversely affect special-status species or migrating birds, or to have significant adverse impacts to foraging bats. However, the Project will alter the lighting regime along the portion of the Guadalupe River adjacent to the Orchard Parkway development site. The increased illuminance along the river and its nearest bank due to the sign is expected to be approximately 0.05 to 0.1 foot-candle, or roughly that equivalent to the range between a full moon and deep twilight. Rich and Longcore (2006) note that lunar light cycles (e.g., full moon conditions versus those of a new moon) have been shown to influence the activity patterns and behavior of a wide variety of nocturnal wildlife.

The Guadalupe River is presumed to be an important movement corridor for animals within urban San Jose. Though generally narrow, and impacted in sections, the river corridor connects south San Francisco Bay and associated fringe habitats (e.g., tidal wetlands, salt ponds) with undeveloped areas upstream of urban San Jose. Along with nearby Coyote Creek, the river appears to be among the most extensive of such corridors that is extant in the area. Potential effects to the river's ability to function as a corridor resulting from increased nocturnal light are expected to be subtle and difficult to quantify or estimate, especially given the lack of information regarding electronic signs. However, because more artificial ambient nocturnal light will presumably be present in the vicinity following development of the Orchard Parkway development site, the status of the river as a relatively "dark" corridor amid generally omnipresent urban lighting may render its local corridor functionality of even greater importance.

Additionally, the altered lighting regime has some potential to alter the behavior of and/or reduce the reproductive success of birds that nest locally within the river's riparian and emergent vegetation. Again, such potential impacts are difficult to quantify or estimate but may not be discountable given the lack of undeveloped areas in the vicinity.

Recommendations

Regarding the proposed electronic sign at the Orchard Parkway development site, WRA recommends the following:

- Based on the assessment above regarding bird attraction to artificial lighting, to avoid directing light upward, it is recommended that shaders as described by H.T. Harvey & Associates (2011) be utilized on the proposed sign if the sign is to be activated during nighttime hours to avoid directing light upward.
- To avoid any potential impacts to the Guadalupe River's ability to function as a general urban wildlife corridor, it is recommended that the light's location be moved far enough away from the river (to the east) so that the expected total increased illuminance along the river (including vegetation along its banks) be less than 0.001 foot-candle (approximately that of a new moon). Alternately, the sign could remain in its current proposed location but be de-activated from 10:00 PM to 6:00 AM (year-round), as is currently being considered as an alternate plan. This de-activation would provide a contiguous block of eight hours each night during which the river remains unilluminated. While neither scenario will completely eliminate the effects of the sign on the river, they should reduce any such potential effects to a less than significant level.

Please do not hesitate to contact me if you have questions or require additional information.

Most sincerely,

A handwritten signature in black ink that reads "Jason Yakich". The signature is written in a cursive style with a large, prominent "Y" and "K".

Jason Yakich
Wildlife Biologist

References

- H.T. Harvey & Associates. 2011. Newark Clear Channel Billboards Project Biological Impacts Assessment (HTH #3285-01). Attachment A of "Initial Study and Mitigated Negative Declaration: Clear Channel Newark Billboards Project" as prepared for the City of Newark, California by Lamphier-Gregory. June. 13 pp.
- Leidy, R.A. 2007. Ecology, Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California. SFEI Contribution #530. San Francisco Estuary Institute, Oakland, California. April. 194 pp.
- Leidy, R.A., G.S. Becker, B.N. Harvey. 2005. Historical distribution and current status of steelhead/rainbow trout (*Oncorhynchus mykiss*) in streams of the San Francisco Estuary, California. Center for Ecosystem Management and Restoration, Oakland, California.
- Patterson, J.W. 2012. Evaluation of New Obstruction Lighting Techniques to Reduce Avian Fatalities. U.S. Department of Transportation, Federal Aviation Administration. May. 26 pp. + appendices.
- Rich, C., and T. Longcore, editors. 2006. *Ecological Consequences of Artificial Night Lighting*. Island Press, Washington, D.C., USA.
- San Francisco Planning Department. 2011. Standards for Bird-Safe Buildings. July. 41 pp.
- Schmid, H., W. Doppler, D. Heynen & M. Rössler (2013): Bird-Friendly Building with Glass and Light. 2., revised Edition. Swiss Ornithological Institute, Sempach.
- Sheppard, C. 2011. Bird-Friendly Building Design. American Bird Conservancy, The Plains, VA, 60 pp.