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Memorandum

Project No. 3980-04

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To: Humboldt Wind, LLC

From: Scott B. Terrill, Ph.D., Senior Ornithologist, Principal, H. T. Harvey & Associates

Subject: **Willow Flycatcher Status and Risk Evaluation for Proposed Humboldt Wind Project, Humboldt County**

Humboldt Wind, LLC is proposing to construct a wind energy resource facility in southern Humboldt County, CA (hereafter the "Project"). The Project has projected a maximum capacity of 155 megawatts that may be generated by up to 60 turbines. The turbines will be installed on Bear River Ridge and Monument Ridge, two prominent ridges that are both bordered by the Eel River to the north and Bear River to the south.

The proposed Project is currently being evaluated as part of the California Environmental Quality Act (CEQA) and other regulatory permitting functions at both the state and federal level. As part of that process, the relevant agencies are evaluating the potential impacts of the Project on special-status species. One of those species, the willow flycatcher (*Empidonax traillii*) is listed as endangered under the California Endangered Species Act (CESA). The state specifically indicates that all species of nesting willow flycatchers are covered under CESA. This coverage extends to both taxa breeding in California (*E. t. extimus and E. t. brewsteri*). Under the federal Endangered Species Act (FESA) only one taxon of willow flycatcher (*E. t. extimus*), known as the southwestern willow flycatcher, is listed; this taxon does not occur in northern California, and thus, there are no willow flycatcher taxa listed under FESA in the Project region.

Status, Distribution and Natural History

Willow flycatchers occur throughout the western, midwestern, and eastern United States, and into southern Canada (Sedgewick 2000). The species was listed as threatened by the state of California in 1991 (CDFG 2010), due to extensive loss of riparian nesting habitat resulting in population declines (McKernan and Whitfield 1994). The southwestern willow flycatcher was federally listed as endangered in 1995 (USFWS 1995) and, as indicated above, this subspecies does not occur in northern California. Historically, willow flycatchers in California were distributed throughout the state wherever appropriate riparian nesting habitat occurred (Grinnell and Miller 1944). However, Grinnell and Miller (1944) noted that this species, as a breeder, was "…very much restricted, to avoid in major part forested areas including the northwest coast belt…". Currently, willow flycatchers are only found in isolated breeding populations in the extreme northern part of the state, the Sierra Nevada and

Cascade ranges, along the Owens River, and in several watersheds in the southern portion of the state (Craig and Williams 1998, Hunter et al. 2005).

Willow flycatchers are common migrants in southern and eastern portions of California (Garrett and Dunn 1981) and in desert areas, they can be quite numerous (e.g., > 20 individuals per day in eastern Kern County - Heindel 2000). Migrant willow flycatchers are much less common west of the deserts and Sierra Nevada Mountains (e.g., see Unitt 1984, Lehman 1994, Roberson 2002, Bolander and Parmeter 2000, and Harris 2006) and are considered "much less common to rare along the coast of central and northern California" (Small 1994).

Willow flycatchers nest in riparian woodlands dominated by willows (*Salix* spp.), cottonwoods (*Populus* spp.), or alders (*Alnus* spp.), and in wet meadows, open second-growth riparian forests, and other moist, shrubby habitats (Harris et al. 1988, Ralph and Hollinger 2003, Sedgewick 2000). They are also known to nest in recent clear-cut forests (5-15 years old) containing hardwoods such as alder and willow (Hunter et al. 2005). They exhibit a preference for disturbed or edge habitats with a relatively open shrub layer (Craig and Williams 1998). Breeding territory sizes are small, generally less than 1 ha, and they forage near their nest sites (i.e., within 100 m; Craig and Williams 1998). They exhibit moderate breeding site fidelity, returning to their nesting territories in subsequent years 20-40% of the time (Craig and Williams 1998). Willow flycatchers arrive on their breeding grounds in mid-May, and breeding occurs from May through August, after which they migrate to southern Mexico, Central America, and northern South America in the fall (Sedgewick 2000). During migration they occur in stopover habitats similar to their nesting habitats during the day, but they also use desert washes and oases, open canyon woodlands near watercourses, and to a lesser extent, agricultural fields (Small 1994, Yong and Finch 1997). They are nocturnal migrants, during which time they travel long distances at high altitudes in an open-front migration with other species of nocturnally migrating landbirds (Alerstam 1993, Sedgewick 2000).

Willow flycatchers feed predominately on flying insects. They capture insects by aerially gleaning (capturing an insect from a substrate while hovering) from trees, shrubs, and herbaceous vegetation, or by hawking by waiting on an exposed perch and capturing flying insects using an horizontal foraging flight (versus ascending or descending flights; Ettinger and King 1980, Frakes and Johnson 1982). They forage in close proximity to perches, (i.e., within 3 m) that are generally 1-3 m from the ground (Frakes and Johnson 1982).

Potential for Interaction with the Project

In northwestern California, willow flycatchers are uncommon during migration, which typically occurs from mid-May through mid-June and late July-September (Harris et al. 1987, Hunter et al. 2005, Ralph and Hollinger 2003), a temporal pattern similar throughout the state (Small 1994). Nesting in Humboldt County appears to be a rare event; based on 5 years (1995-1999) of intensive breeding bird surveys conducted throughout Humboldt County, there were only one confirmed, two "probable" and four "possible", breeding occurrences reported (Hunter et al. 2005). The single breeding confirmation "came as one of the highlights of the Atlas project" (Hunter et al. 2005). Humboldt county summer records are further described in Harris (2006). A relatively unique problem associated with willow flycatchers is that spring migrants occur at nonbreeding

locations into July (Heindel 2000, Terrill pers. ob.) and fall migrants start to show up at nonbreeding locations in late July, indicating that migrants occur virtually throughout the summer and it is difficult to determine whether summer records pertain to migrants or actual breeding individuals unless there is proof of nesting. None of the records in Hunter et al. (2005) were in the Project area, although 2 of the possible and 1 of the probable breeding occurrences were in the lower Eel River corridor roughly 9 miles north of the Bear River Ridge plan area. During fall migration, willow flycatchers are generally uncommon from late July to late September along most of the California coast; however, they are rare in coastal northwestern California, and are found in greater numbers in inland areas in northwest California and southwest Oregon (Ralph and Hollinger 2003).

Locally breeding willow flycatchers are unlikely to be affected by the Project (including construction, operation and maintenance, and decommissioning). The project area contains little nesting or favorable foraging habitat and willow flycatchers are extremely scarce as breeders in Humboldt County. Therefore, the probability of the project impacting a breeding willow flycatcher is extremely unlikely. Likewise, the project site does not comprise ideal migratory stopover habitat for nonbreeding migrants, although migrants might occasionally occur in the Project area. Migrant willow flycatchers prefer willow riparian and coastal willow patches in the region (Harris 2006) and willow groves and other riparian habitats are relatively widespread in Humboldt County and do not appear limited with respect to willow flycatcher stopover habitat. Construction of the project would therefore not have a significant impact on individual breeding or migrant willow flycatchers, nor would it substantially impact habitat for this species.

With respect to potential turbine collisions, the probability of a breeding, or potentially (California) breeding, willow flycatcher interacting with a wind turbine at the Project location should approach zero. As indicated above, this species is quite rare in Humboldt County as a breeder. Multiple surveys (2018) did not detect willow flycatchers in the Project area, and the Project area contains little nesting or foraging habitat. In addition, surveys conducted for an earlier wind project proposed at Bear River Ridge did not detect this species during more that 1,000 point counts spread throughout the year over a two and a half-year period (Mad River Biologists 2008).

Non-California breeding migrant willow flycatchers are also scarce in the Project region, but some migrant willow flycatchers may migrate over the Project site. Willow flycatchers, like many passerines (songbirds) migrate nocturnally. For most passerines, the average migration altitude is between 500-1000 feet (Bellerose 1971), with many cases of nocturnal migrants flying higher than 1000 feet (Newton 2008) (an observation strongly supported by radar studies at wind resource projects – e.g., see Johnston et al 2013, Aschwanden et al. 2018). However, altitudes of migration are variable and subject to influence by weather. Migrants must land and take off for ascent and descent in migration, and altitudes of migration can be lower than normal when crossing a ridge. Nevertheless, given the relative scarcity of migrant willow flycatchers in the Project region and the typical altitude of nocturnally migrating passerines, turbine collision risk should be very low.

In addition to these factors, high avoidance rates have been attributed to passerines and avoidance rates of as low as 0.97 and as high as 0.99 have been measured for them (Winkelman 1992, as cited in Chamberlin et al. 2006, Aschwanden et al. 2018). Studies of nocturnal bird migration using an X-band tracking-radar demonstrated that direct avoidance of turbines by migrants was quite clear in many cases, indicating that nocturnally migrating birds can detect and avoid turbines (Larkin 2010). Aschwanden et al. (2018) studied nocturnal migrants at a wind farm in a mountainous area in Switzerland using dedicated radar coupled with fatality searches (with appropriate correction factors) at turbines from February to mid-November (2015). Based on 1.65 million birds per km that passed through the wind facility with 390,500 flying at turbine risk height, they estimated 21 bird collisions per wind turbine and concluded that these birds exhibited a median avoidance of 97.9% (95% CI: 97.0 - 98.5%).

A rigorous study of the interaction of nocturnal migrants and turbines was conducted at the Montezuma Hills Wind Resource Area in northern California using nightly radar, night vision and acoustic monitoring (Johnston et al. 2013) to determine nocturnal flight directions, passage rates, and flight altitudes of birds and bats coupled with daily carcass searches to assess fatality rates as a function of movement patterns in the wind resource area during fall migration periods from 15 August to 15 October 2009 and 30 August to 28 October 2010. Although the average nocturnal passage rates ranged from 326-454 targets per kilometer per hour (a high rate for the western United States), only 2-6 percent of the total passed through at altitudes less than the 125 meters above ground level, the height where birds and bats where at risk of collision with wind turbines. Six nocturnal-migrant bird fatalities were observed during the surveys. N Nocturnal migrants do collide with wind turbines and, while the exact proportion of migrants colliding with turbines varies due to site-specific characteristics, this proportion appears quite low relative to total numbers of birds migrating over wind resource projects.

Conclusions

Thus, taken in combination, the regional scarcity of willow flycatchers (especially as breeders), the fact that the majority of nocturnal migration occurs above turbine height, and the apparent high avoidance rates attributed to nocturnal migrants indicates that willow flycatchers should be at very low risk of collision with the Project turbines.

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