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GREEN ROAD CONSULTING

Sound Evaluation Report

Prepared For:

Humboldt Herritage, LLC

APN: 216-281-015

Signature of Civil Engineer | Date | Seal

Introduction:

Green Road Consulting (GRC) performed a sound evaluation study to determine changes in ambient noise levels related to cannabis cultivation activities. Cannabis cultivation in Humboldt County is typically done in rural areas that require the use of off-grid power from diesel generators. The use of diesel generators in conjunction with cannabis cultivation activities has the potential to significantly alter natural sound levels and disturb native animals. However, parcels with zoning TPZ or U (with a General Plan Land Use Designation of "Timberland" or "Unclassified") are prohibited from using generators.

Background:

On May 6, 2018, the Humboldt County Board of Supervisors passed Ordinance No. 2599 defining the rules and regulations of commercial cultivation, processing, manufacturing, distribution, testing and sale of cannabis for medicinal or adult use outside the coastal zone. Section 55.4.12 of the ordinance describes the performance standards related to all commercial cannabis activities at cultivation sites that must be met for the applicant to be eligible for a commercial cannabis cultivation permit issued by Humboldt County. As defined in Section 55.4.12.6 regarding noise, "Noise from cultivation and related activities shall not result in an increase of more than three decibels of continuous noise above existing ambient noise levels at any property line of the site."

Oxford Dictionary defines noise as "a sound, especially one that is loud or unpleasant or that causes disturbance" (Oxford Dictionary 2018). In terms of physics, sound is a mechanical disturbance from a state of equilibrium that propagates through an elastic material medium, such as water or air (Britannica 2018). Humans have evolved to be more receptive to sound frequencies between 500 Hz and 6 kHz (measured in decibels, dB), however, sounds can occur below or above the range of human hearing. To account for the full range of human hearing, the "A-weighted" scale was created to include a full range of frequencies, from 20 Hz up to 20 kHz and is measured in dBA (Britannica 2018). Several activities and their associated noise level for indoor and outdoor settings have been measured and are shown in Figure 1 for reference (West Los Angeles College ND).

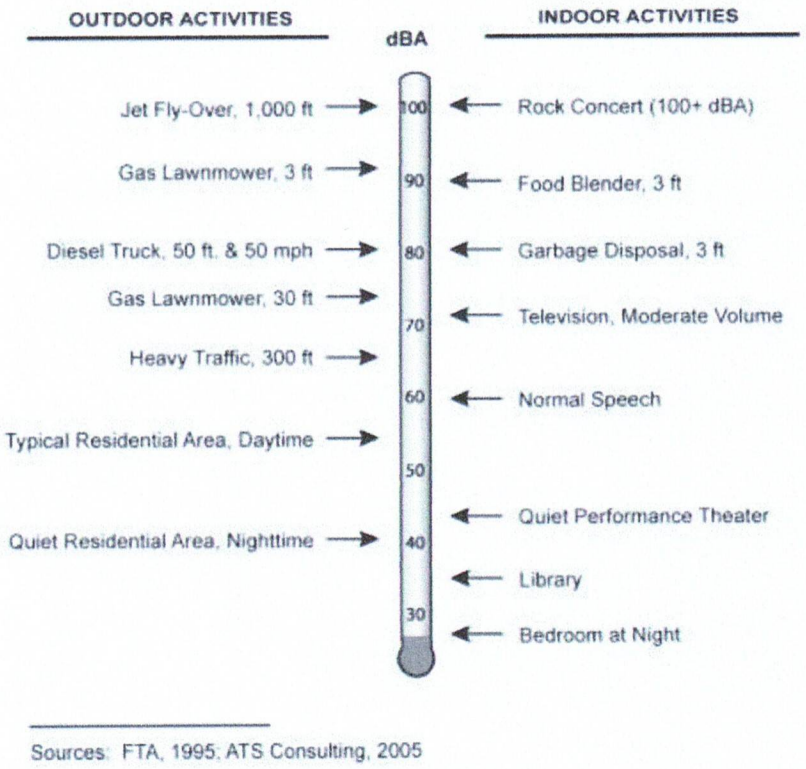

Figure 1: Examples of noise levels for indoor and outdoor settings.

Site Summary:

APN: 216-281-015

Coordinates: <40.1700, -123.6153 >

Acreage: 63.0

Zoning: FR-B-5(5)

Methods:

Two, 24-hour studies will be conducted by GRC on APN 216-281-015 using four CEM DT-8852 Industrial High Accuracy Digital Sound Noise Level Meter Data Loggers. These sound level data loggers feature a measurement range of 30-130 dB with an accuracy of ±1.4 dB, and internal memory for standalone data recording. The first study was conducted before cannabis cultivation activities began on the parcel to establish a baseline ambient sound level to compare to future measurements. After cannabis cultivation activities begin, a second 24-hour study will be conducted to capture the increase, if any, of sound levels related to cannabis cultivation.

If the parcel is located within one mile of mapped critical habitat for Marbled Murrelet or Northern Spotted Owls, the maximum noise expose from background cultivation related noise cannot exceed 50 decibels at a distance of 100 feet from the noise source or edge of habitat, whichever is closer. If pre-existing cultivations sites submitted for permitting prior to December 31, 2019 are located within 0.7 miles of a known Northern Spotted Owl activity center a qualified biologist shall conduct a disturbance and habitat modification assessment to determine the presence of the species and whether the cultivation site can operate or have its operation modified to avoid take of the species.

Two sound monitoring studies are required to determine how cannabis cultivation activities effect the ambient noise levels on the property. For the duration of each study, one (1) noise level data logger was placed as close to each property boundary line as possible (minimum of 3) to capture the noise level being emitted from within the parcel (Figure 2). Data was collected every 6 seconds for at least 24 hours. The first 24-hour study was conducted from 12/17/2018 through 12/18/2018, before cannabis cultivation activities occurred on the property. The data was uploaded to Microsoft Excel, where a moving average was performed on 2,000 data points to relax any extreme short-term fluctuations in the time-series data. The second 24-hour study will be conducted when commercial cannabis activities begin.

Critical habitats for Marbled Murrelet and Spotted Owls have been mapped by California Department of Fish and Wildlife (CDFW) and were viewed using a commercial license to the California Natural Diversity Database (CNDDB). The CNDDB uses the Biogeographic Information and Observation System (BIOS) to project observed critical habitat for Marbled Murrelet and Spotted Owls in an online mapping tool. This online mapping program has a distance measuring tool that was used to find the distance from this parcel to the nearest marked critical habitat.

Figure 2: Map of data logger locations on APN 216-281-015

Results:

Data from the sound study conducted during the no-cultivation period were imported into excel and plotted on a line chart to visualize the measurements over time. Rolling averages were applied to groups of 2,000 data points, which were compared to the original data (Figures 3-6).

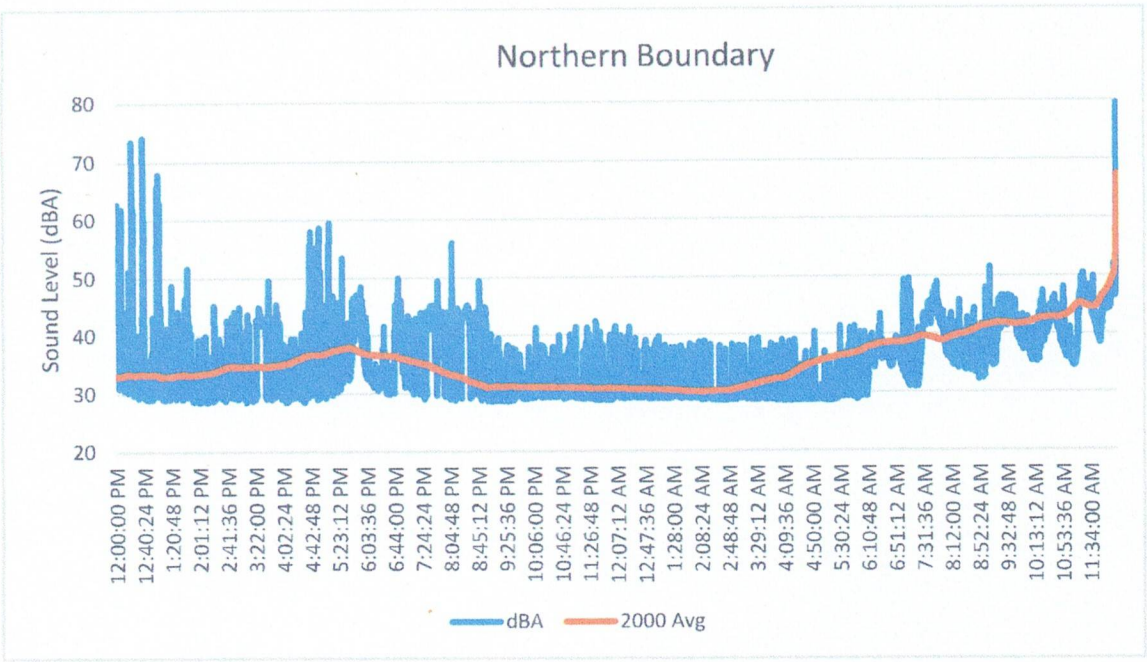

Figure 2: Results from 24 hours of sound data collected on 12/17/2018-12/18/2018 near the Northern parcel boundary. The 2,000 data point rolling average are overlaid on the original data. ***Average dBA: 34.55***

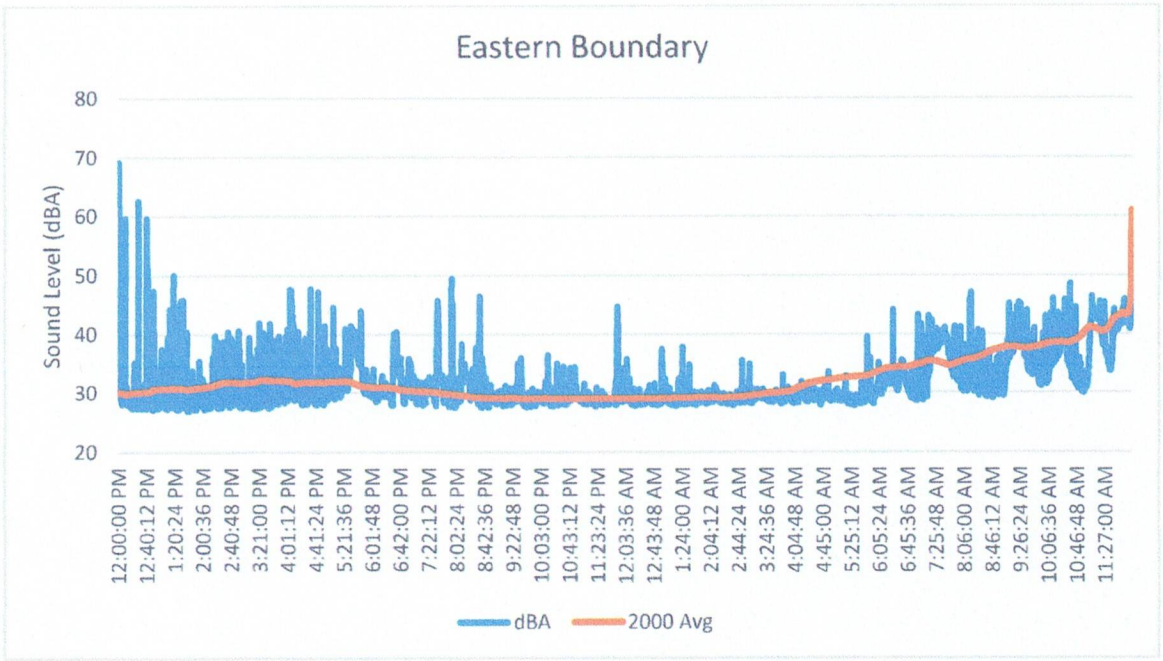

Figure 3: Results from 24 hours of sound data collected on 12/17/2018-7/18/2018 near the Eastern parcel boundary. The 2,000 data point rolling averages are overlaid on the original data. ***Average dBA: 31.43***

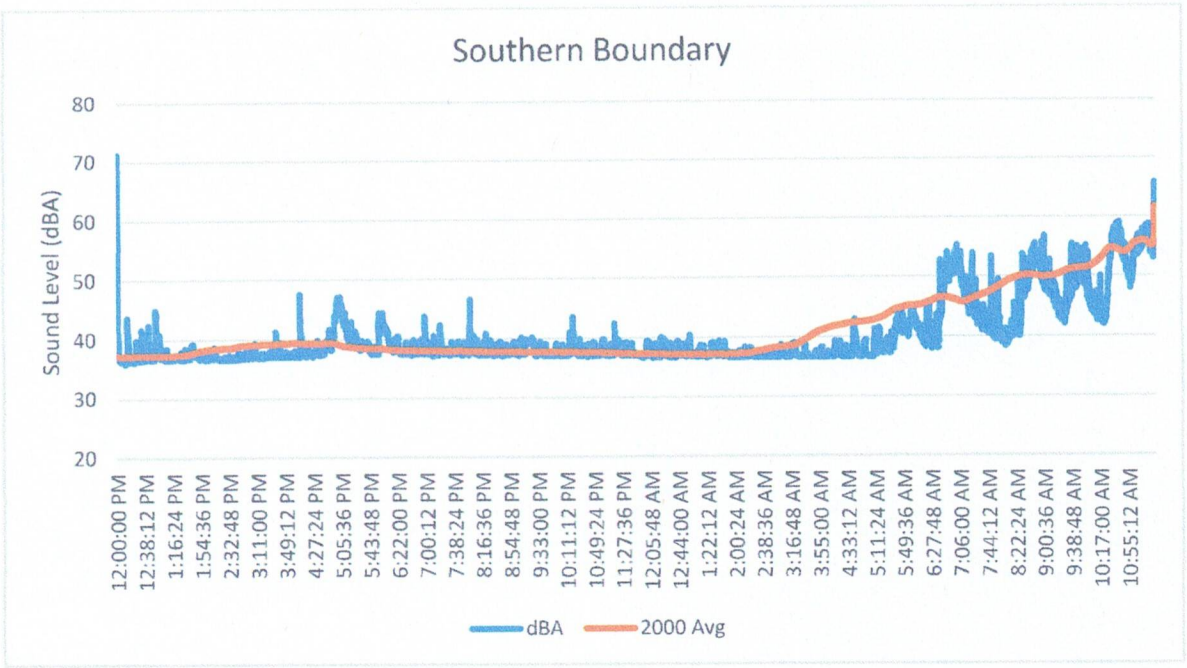

Figure 4: Results from 24 hours of sound data collected on 12/17/2018-12/18/2018 near the Southern parcel boundary. The 2,000 data point rolling averages are overlaid on the original data. ***Average dBA: 40.11***

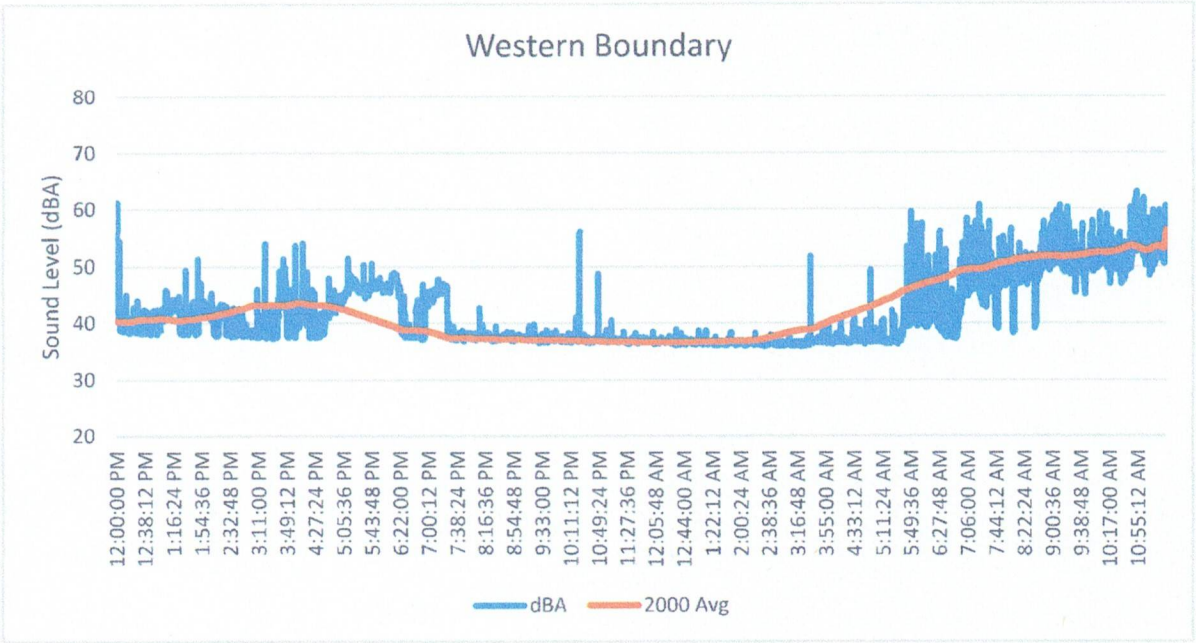

Figure 5: Results from 24 hours of sound data collected on 12/17/2018-12/18/2018 near the Western parcel boundary. The 2,000 data point rolling averages are overlaid on the original data. ***Average dBA: 41.34***

The second sound study will be performed after Cannabis cultivation commences. That study will be used to identify if there is an increase of 3 decibels or more. If an increase of over 3 decibels is observed, changes will be made to reduce the sound levels.

Critical Habitat:

Considerations of noise levels affecting the Marbled Murrelet and Northern Spotted Owl was determined using the California Department of Fish and Wildlife's Biogeographic Information and Observation System (BIOS). This system utilizes the California Natural Diversity Database (CNDDB) to visualize positive observations and critical habitat for rare and sensitive species.

Critical habitat areas for the Marbled Murrelet and Spotted Owl were viewed in the CNDDB BIOS Viewer. The property was located 4.046 miles from mapped Marbled Murrelet critical habitat areas (Figure 11).

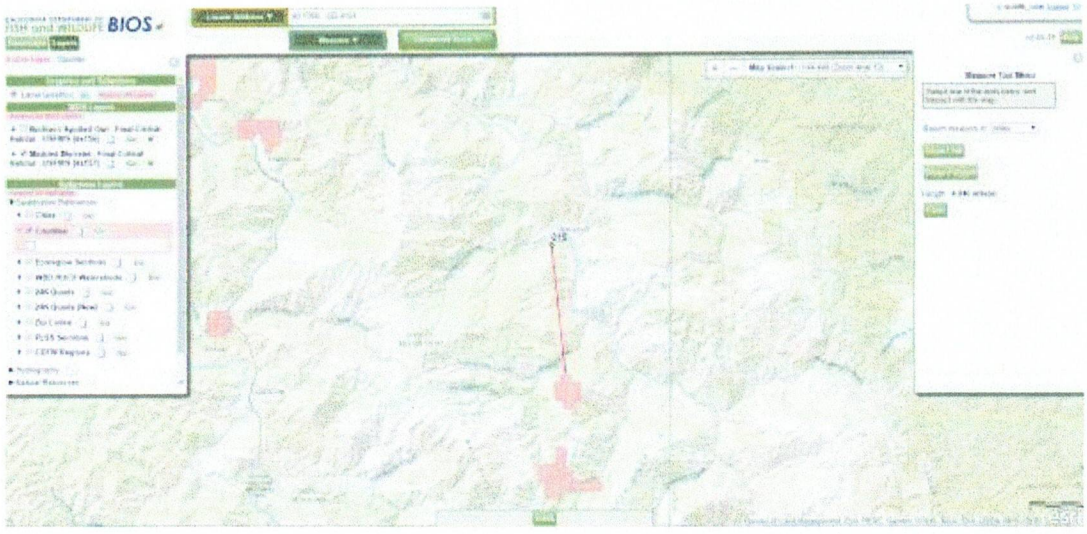

Figure 6: Snip of the CNDDB BIOS Viewer used to determine the extent of critical habitat of Marbled Murrelet (red square) relative to the parcel (Yellow dot, labeled 015). A distance of 4.046 miles was measured from the center of the parcel to the edge of the mapped critical area.

Critical habitat area for the Northern Spotted Owl was observed 6.223 miles to the North of APN 216-281-015 (Figure 12).

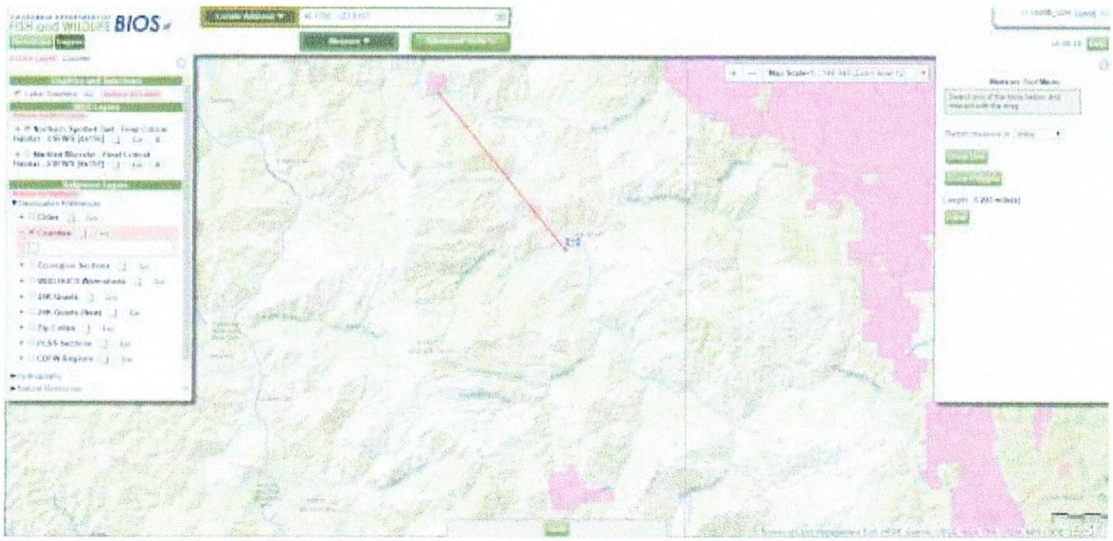

Figure 7: Snip of the CNDDB BIOS Viewer used to determine the extent of critical habitat of Spotted Owls (pink square) relative to the parcel (Yellow dot, labeled 015). A distance of 6.223 miles was measured from the center of the parcel to the edge of the mapped critical area South of the property.

Activity centers for the Northern Spotted Owl have been observed near Alderpoint. Activity centers are historic nesting sites that have been observed by qualified professional and entered in the CNDDB database. Two activity centers have been mapped near the parcel, one to the North and one to the South. The distance from the center of the parcel to the edge of the activity centers were measured using the embedded Measure Tool within the BIOS Viewer (Figure 13 and Figure 14).

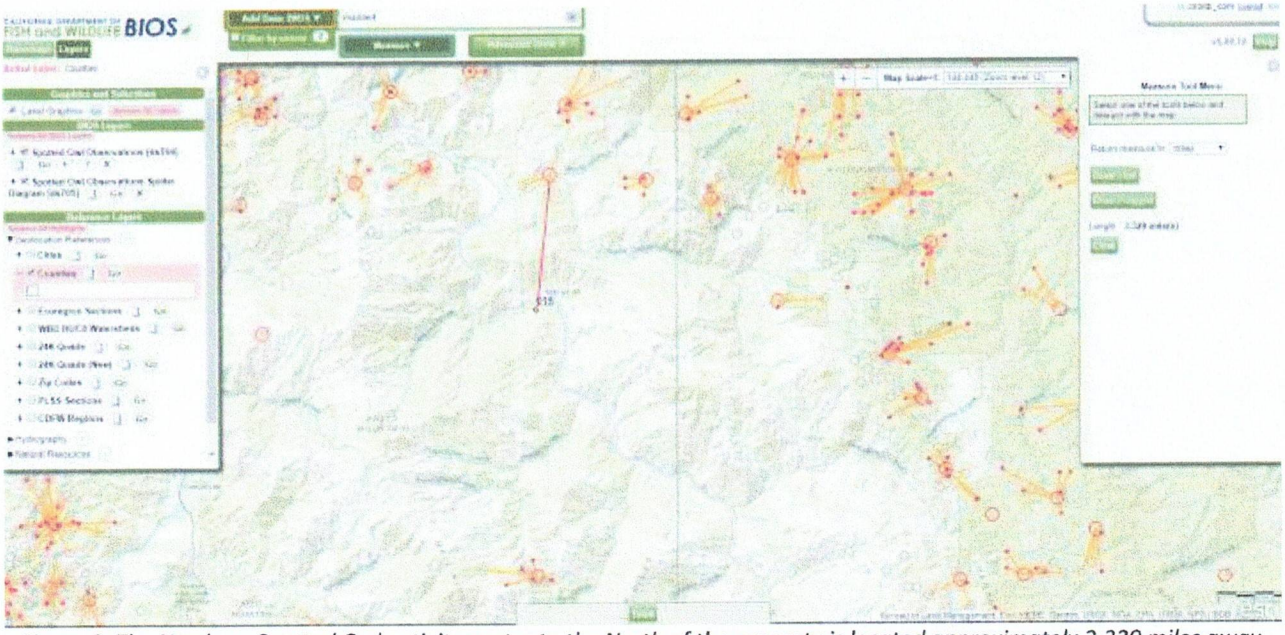

Figure 8: The Northern Spotted Owl activity center to the North of the property is located approximately 3.329 miles away from the property of interest.

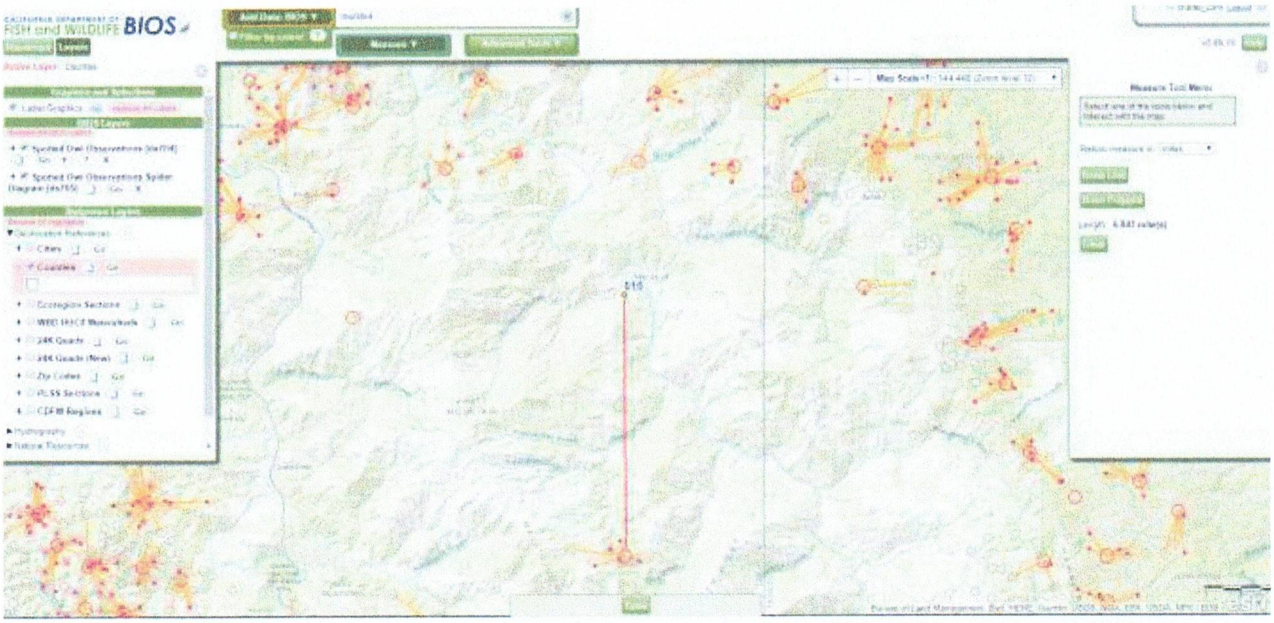

Figure 9: The Northern Spotted Owl activity center to the South of the property is located approximately 6.847 miles away from the property of interest.

Both Northern Spotted Owl activity centers are more than the required minimum .7 miles from the site, and do not require any qualified biological assessment.

Conclusion:

An initial sound study was conducted during a no-cultivation period on APN 216-281-015. During this study, the site was free of cultivation related activities, free of noise pollution, and produced no noise from any generators or fans. Only ambient noise from county roads and wildlife could be heard during this initial study. Data from this first study will be compared to a second sound study. The second study will take place once a cultivation permit has been issued by Humboldt County and cultivation begins in order to determine changes in ambient noise levels caused by cannabis cultivation activities. The Pre-cultivation and active cultivation studies will be compared for each Data Logger point (North, East, South, West) to assess if there is an average increase of 3 decibels or more from any pre-cultivation data logger average. If an increase of 3 decibels or more is observed after the second study, changes will be made to attenuate sound production at the site. See Appendix A for mitigation methods.

The North, East, South, and West Data Logger point measured average levels of 34.55 dBA, 31.43 dBA, 40.11 dBA, and 41.34 dBA, respectively. These measurements will serve as a baseline for ambient noise levels at the site. We would hope to find sound levels not exceeding 45 decibels in the following study due to the 3-decibel increase cap set forth by Humboldt County Ordinance 2.0 Performance Standards for Noise at Cultivation Sites.

The parcel is located 3.329 miles from a mapped Northern Spotted Owl activity center to the North and 6.847 miles from a mapped activity center to the South. Both activity centers are located outside of the 0.7-mile buffer set forth by California Department of Fish and Wildlife. Therefore, it is unlikely noise caused by cultivation operations on this parcel will negatively impact Northern Spotted Owl activity. A Biological Assessment Report prepared for this site by S.E. McAllister & Associates states, "Harassment associated with noise disturbance at the site is not expected. The project is proposed for permitting under Humboldt County Ordinance 2.0 and will, therefore, only be allowed to use generators for 20% of its power needs and will instead primarily use solar energy."

The parcel is located 4.046 miles from mapped critical habitat for the Marbled Murrelet. Critical habitat for the Northern Spotted Owl has been mapped 6.223 miles from the parcel. Because of this, there are no wildlife specific noise requirements on this parcel, but noise production must still comply with the 3 decibel Humboldt County standard.

References:

Humboldt County Ordinance No. 2599.

"Noise." Def.1. OxfordDictionaries.com. Oxford Dictionaries, 2018. Web. 5/31/18.

Berg, R. 2018. "Sound", Encyclopaedia Britannica, Inc., Encyclopaedia Britannica. 6/1/2018

"Noise Basics". West Los Angeles College Noise Monitoring Program. ND. 6/26/2018

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Appendix A

Methods for Reducing Cannabis Cultivation Related Noise

- Ensure ventilation fans do not contact greenhouse framework. This can reduce rattle and vibrations. Fans can be suspended from above to ensure limited structural vibrations.
- Air and water pumps and generators may be placed on one-inch rubber mats to reduce vibration.
- Use insulated ducting instead of bare metal.
- Outdoor generators may be placed in insulated sheds to reduce noise output.
- Place a muffler over greenhouse exhaust vents.
- Locate generators away from property lines, and place as centrally as possible.
- Use natural landscape features to block noise (Plant tall bushes or trees, locate generators behind natural soil berms, etc.)
- Consider the use of low noise fans and generators.